Improving ERP implementations from the users' viewpoint

University of Oulu
Faculty of Information Technology and
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Master's Thesis
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3.10.2021

Abstract

In this thesis a model is created to understand end users' viewpoint and improve the success-rate in Enterprise Resource Planning (ERP) system implementations. The model is formed based on previous literature. A survey is conducted in a multinational EMS-company to understand the users' experiences and feelings in ERP implementation project. The model is discussed and evaluated by the company's ERP project management and project group.

The thesis uses Design Science Research as a research method. The Unified Theory of Acceptance and Use of Technology by Venkatesh, Morris, Davis, Davis (2003) is the basis for this thesis, and the model created in this thesis is built based on the model by Venkatesh et al. (2003). The model created is the artifact of the Design Science Research process.

The main contributions of this thesis are the model which includes the debated factor Attitude, and the survey which was conducted in a multinational company. In the model constructs Behavioral Intention and Use Behavior were united as Symbolic Adoption, due to non-shared meaning of the construct of Behavioral intention in the previous literature. The factor Facilitating Conditions was related to Symbolic Adoption. For the moderating factors of the UTAUT-model (Venkatesh et al., 2003) the factor of Voluntariness was left out from the model, since the ERP implementation setting is mandatory. The moderating factor Gender was re-defined as Gender Roles, as was already highlighted in the original model by Venkatesh et al. (2003).

Keywords

Enterprise Resource Planning, ERP, User Acceptance, UTAUT, Design Science Research, Attitude

Supervisor

University Lecturer Mikko Rajanen

Foreword

I want to thank University Lecturer Mikko Rajanen for helping me with this thesis.

I also want to thank my family, Andreas and Minni for supporting me.

Abbrevations

ERP	Enterprise Resource Planning –system, highly complex information systems used by organizations which integrate all the data of the organization to one database and interface
UTAUT	Unified Theory of Acceptance and Use of Technology, model which unified the essential elements of eight previous models and on which this thesis is built on
DSR	Design Science Research, research method used in this study
MRP	Material Requirements Planning –system, information systems which were used by organizations mostly in the 1970's
MRP II	Material Resources Planning –system, evolved version of MRP-systems
EMS	Electronics manufacturing services, term used for companies that design, test, manufacture and distribute electronic components and assemblies

Contents

1. Introduction

The term “ERP” stands for “Enterprise Resource Planning”. ERP systems are information systems, which integrate a unified view of the enterprise that include and encompasses all departments and functions, and which record all the data provided of the enterprise to the databases which can be processed, monitored and reported. Because of the complex nature of ERP systems, the implementation projects are also complex, and costly in resources (Umble, Haft & Umble, 2003).

The reason why organizations are interested in implementing ERP systems, even though the implementation might be so risky, is that integrating all data into one database, application and interface gives the tools for accessing real time information and processing up-to-date data, for quicker reactions to the market opportunities and competitive pressure and improved delivery performance (Bingi, Sharma & Godla, 1999).

ERP implementations have been studied for decades, and still, even today, it is a big risk for the company to implement. This thesis tries to develop a model to explain different constructs affecting user’s technology adoption in ERP implementations.

Several models have been developed to understand user acceptance in technology. Latest significant model on the field of user acceptance in information technology field has been The Unified Theory of Acceptance and Use of Technology (UTAUT), which has reported to explain 70% of the variance in user intentions to use information technology (Venkatesh et al., 2003). UTAUT unites the previous models, such as Theory of Reasoned Action, Theory of Planned Behavior and Technology Acceptance model, and it is one of the most significant recent base theories. UTAUT has several extensions, some of them of ERP implementations. This model still does not explain user acceptance fully, and is not totally applicable to the setting of companies’ ERP projects.

By solving this problem and acquiring a better view of where to put organization’s resources in the implementation projects lots of resources are being saved, and the project can be expected to have a better success level.

The objective of this thesis is to develop a model that will be developed based on the state-of-the-art research and a user survey. The survey conducted in a company which implemented an ERP system is used to give guidance of the needed actions during the implementation project. The model, which is the artifact produced in this thesis, needs to be applicable to companies’ ERP implementation setting, and take into account the special environmental factors that companies’ ERP implementation environment has compared to general user acceptance of technology.

The model will help companies to take into account the factors which affect the overall successfulness of the implementation project and system adoption from the end users' viewpoint.

The exact research question is: "Which constructs affect user's technology adoption in ERP implementations?"

The research method used is Design Science Research (DSR), and the design artifact, the model, is designed by the principles of DSR. The approach is problem-centered, and the acknowledged problem stated in literature is that many of ERP implementations do not achieve the desired level of success. Users are an important factor of the implementation project, and the artifact is built based on the user's point of view. The artifact is built based on existing literature and models, and based on the survey conducted in a multinational EMS company, which implemented an ERP system to all their sites. The artifact is evaluated by the ERP implementation project management and project group.

The use of the artifact built on this study is demonstrated with evaluation. The purpose was to evaluate the model in action in 2020-2021 in a new implementation project, but due to Covid-19 the implementation was postponed and therefore the evaluation could not be done. The artifact is evaluated by the project management and the project group of the company where the survey is held, and evaluation using the survey conducted is done.

2. Prior research

In this chapter the prior research of the field is introduced. First, ERP systems and ERP system implementations are introduced. Then, the models which have been developed to help in the implementation projects are introduced. Last we take a look in to the extensions of the Unified Theory of Acceptance and Use of Technology (UTAUT)-model, and the constructs of the models which have been under debate.

2.1 ERP systems

ERP systems are complex, companywide systems that integrate all the data to one database, application and interface throughout the whole organization. ERP system enables the organization to access real-time data and to improve the organization's processes (Bingi et al., 1999). The need for gathering and processing more data from the processes and statistics of the organization for competitive reasons has made ERP's role more crucial in an organization, and the organizations many times depend on the help of ERP-systems in the decision making process (Holsapple, Sena & Wagner, 2019).

The evolution towards ERP system started in the 1960's. Companies used to have different softwares for inventory control, and in the 1970's these softwares started to evolve to Material Requirements Planning (MRP) systems. MRP systems provided much wider view of the enterprise from bare inventory control. MRP evolved to Material Resources Planning (MRP II) systems in the 1980's, including financial systems. MRP II provided more support for decision making, and therefore it widened the possibilities of use of the information system. In the 1990's MRP II included all aspects of the business; human resources, product design, warehouse, finance, materials and capacity planning, and so on. This was now possible due to improvements in technology, and the term Enterprise Resource Planning (ERP) was created (Umble et al., 2003).

2.2 ERP implementations

ERP implementations are complex projects, and often they are the biggest project an organization has launched. The project requires massive amount of resources, commitment and adjustments all over the organization (Kraljić, Kraljić, Poels & Devos, 2014). When an organization is considering if to implement an ERP system, the various risks may be a source of worry. Even if organizations have been implementing these systems for decades now, the failure rate remains relatively high (Mahmood, Khan & Bokhari, 2019). The definition of a "failure" varies though, and the rates for a failure depends on the definition. In case of a failure the organization will suffer major costs, and in some cases, even bankruptcy (Kraljić et al., 2014). Organizations can choose from several implementation strategies to avoid failures, but many still struggle (Okrent & Vokurka, 2004). Researchers have listed "Critical Success Factors" for ERP-implementation projects, such as re-designing business processes, training, management support and effective communication (Sumner, 1999). The benefits of implementing the

system are organization-wide, and if done correctly, ERP brings improved customer satisfaction, profits, quality and reduces costs (Okrent & Vokurka, 2004).

2.3 Developed models

User acceptance plays an important role in ERP implementation projects. The fact if users accept the technology can affect significantly to the successfulness of the project (Venkatesh & Davis, 2000). Researchers have developed different kind of models which try to explain the users' technology acceptance and usage. Many times the base of the models is formed from psychology and built up from previous models (Venkatesh et al., 2003).

Unified Theory of Acceptance and Use of Technology (UTAUT) is a model uniting the most significant contributions of the user's information technology acceptance field, and it contains the following models; Theory of Reasoned Action (TRA) (Davis, Bagozzi & Warshaw, 1989), Theory of Planned Behaviour (TPB) (Ajzen, 1991), Technology Acceptance Model (TAM) (Davis, 1989), Motivational Model (Davis, Bagozzi & Warshaw, 1992), Combined TAM and TPB (Taylor and Todd, 1995), Model of PC Utilization (Thompson, Higgins & Howell, 1991), the Innovation Diffusion Theory (Moore & Benbasat, 1991), and the Social Cognitive Theory (Compeau & Higgins, 1995a, Compeau & Higgins, 1995b).

2.3.1 Theory of Reasoned Action and Theory of Planned Behavior

Theory of Reasoned Action (TRA), originally developed by Fishbein and Ajzen in 1975, was applied to technology acceptance by Davis in 1989 (Venkatesh et al., 2003). In TRA, key concepts attitude (A) and subjective norm (SN) define person's behavioural intention (BI), which determines his or hers actual behaviour. Beliefs and evaluations affect the attitude (A), and normative beliefs and motivation to comply affect the subjective norm (SN) (Davis et al., 1989).

Theory of planned behaviour (TPB) is an extension to TRA, and it recognizes the problem in TRA in situations where people do not have complete volitional control, and adds perceived behavioural control (PBC) to the model. Perceived behavioural control means the person's perception of the difficulty or ease to perform the behaviour, reflecting past experiences and anticipations of obstacles. TPB recognizes the importance of actual behavioural control, including factors such as availability of requisite opportunities and resources, but it argues that the perceived behavioural control can be used to predict successful behavioural attempt. In TPB the perceived behavioural control affects and is affected by both Attitude toward the behaviour and subjective norm. It furthermore affects the intention, and has therefore an effect to the actual behaviour (Ajzen, 1991).

2.3.2 Technology Acceptance Model

Technology acceptance model (TAM) was developed by Davis (1986) in his dissertation to model user acceptance of information systems. TAM is an adaptation of TRA. TAM introduces the concepts of perceived usefulness (PU) and perceived ease of use (PEU), which later on have been used in multiple other studies. It shows the effect of perceived usefulness and perceived ease of use to the Attitude towards using, which

then affects the actual system use. In the model perceived ease of use also has a causal effect on perceived usefulness, arguing that a system which is easy to use will lead to higher job performance (Davis, 1986).

The model of Combined TAM and TPB combines Attitude Toward Behavior (A), Subjective Norm (SN) and Perceived Behavioral Control (PBC) from TRA/TPB to Perceived Usefulness (PU) from TAM, and creates a hybrid model of these two (Taylor and Todd, 1995).

Venkatesh and Davis developed TAM2, adding new factors to the base model and excluding the Attitude-factor from the model. They introduced two new constructs to the model: Social Influence Processes (including subjective norm, voluntariness and image), and Cognitive Instrumental Processes (job relevance, output quality, result demonstrability and perceived ease of use) (Venkatesh & Davis, 2000).

2.3.3 Motivational Model

Motivational Model was brought from psychology to Information Systems research by Davis et al. (1992). In their study Davis et al. (1992) note that based on previous research perceived usefulness is a major determinant of intention to use, and research also the effect of enjoyment on intention to use computers in workplace. They found a positive interaction between usefulness and enjoyment.

The model has two core concepts, Extrinsic Motivation and Intrinsic Motivation. Extrinsic Motivation is defined as the perception of users performing the activity to achieve outcomes distinct from the activity itself, and the Intrinsic Motivation is defined as the perception of the users performing the activity for the process of performing the activity itself (Davis et al., 1992).

2.3.4 Model of PC Utilization

Model of PC Utilization was refined by Thompson et al. (1991) based on Triandis' Theory of Human Behavior (1980), where Triandis divides the beliefs a person has into two categories: (1) the beliefs that link emotions to the act and are occurring at the moment of action, and (2) the beliefs that link the act into future consequences. The core constructs of the Utilization of PC model are Job Fit With PC Use, Complexity of PC Use, Long-Term Consequences of PC Use, Affect Toward PC Use, Social Factors Influencing PC Use and Facilitating Conditions for PC Use (Thompson et al., 1991).

In their study Thompson et al. (1991) test Triandis' (1980) work and come into conclusion, that it can be used also in future research. Thompson et al. (1991) highlight in their study that especially social factors, complexity, job fit and long-term consequences had significant effects.

2.3.5 Innovation Diffusion Theory

Innovation Diffusion Theory (IDT) bases on social science, and it was developed to measure users' perception of adopting an information technology innovation. It has 7 core constructs; Relative Advantage, Ease of Use, Image, Visibility, Compatibility, Results Demonstrability and Voluntariness of Use (Moore & Benbasat, 1991). The

study focused on perceived characteristics of innovation, and it was derived by the five characteristics of innovation based on Rogers (1983); Relative Advantage, Compatibility, Complexity, Observability and Trialability (Moore & Benbasat, 1991).

2.3.6 Social Cognitive Theory

Social Cognitive Theory was applied from social cognitive science. It states that all behaviour, environment and person affect each other in a triangular way, and it has 5 core concepts; Outcome expectations relating to performance, outcome expectations relating to personal (Compeau & Higgins, 1995a), self-efficacy, affect and anxiety (Compeau & Higgins, 1995b).

In their first work Compeau & Higgins (1995a) researched the training as a contributing factor to the productive use of computers, focusing in the training process. In their other release (Compeau & Higgins, 1995b) the role of individuals' beliefs were discussed considering their abilities to use computers.

2.4 Unified Theory of Acceptance and Use of Technology

UTAUT (Unified Theory of Acceptance and Use of Technology) was made to unify the essential elements of eight models (theory of reasoned action, the technology acceptance model, the motivational model, the theory of planned behaviour, a model combining the technology acceptance model and the theory of planned behaviour, the model of PC utilization, the innovation diffusion theory and the social cognitive theory), and it outperforms the usage of these separate models individually. Of the various core constructs of these models, the most significant ones considering the intention to use the technology seem to be performance expectancy, effort expectancy, social influence and facilitating conditions. The constructs of Attitude toward using technology, self-efficacy and anxiety were left out from the model, even though these had been included in the previous models (Venkatesh et al., 2003).

2.4.1 Constructs

In the UTAUT-model there are four constructs that have a direct effect on user acceptance and user behaviour; Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions (Venkatesh et al., 2003).

Performance Expectancy is the strongest predictor of intention, and is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003).

Effort Expectancy is defined as the degree of ease associated with the system use. It is said to be significant both in voluntary and mandatory use, but becomes non-significant on the periods when the system use is sustained and extended (Venkatesh et al., 2003).

Social Influence is defined as the degree how an individual believes the important ones think he or she should use the system. This construct is especially significant when the use is mandatory, and is important in the early stages, and becomes nonsignificant with sustained use (Venkatesh et al., 2003).

Facilitating conditions means the organizational and technical infrastructures that support the use of the system, and as a construct, it is defined as the degree which an individual believes that these infrastructures exist to supports their system use. It is not a determinant of behavioral intention, but a direct determinant of use behaviour (Venkatesh et al., 2003). The relations between constructs and moderating factors can be seen in Figure 1.

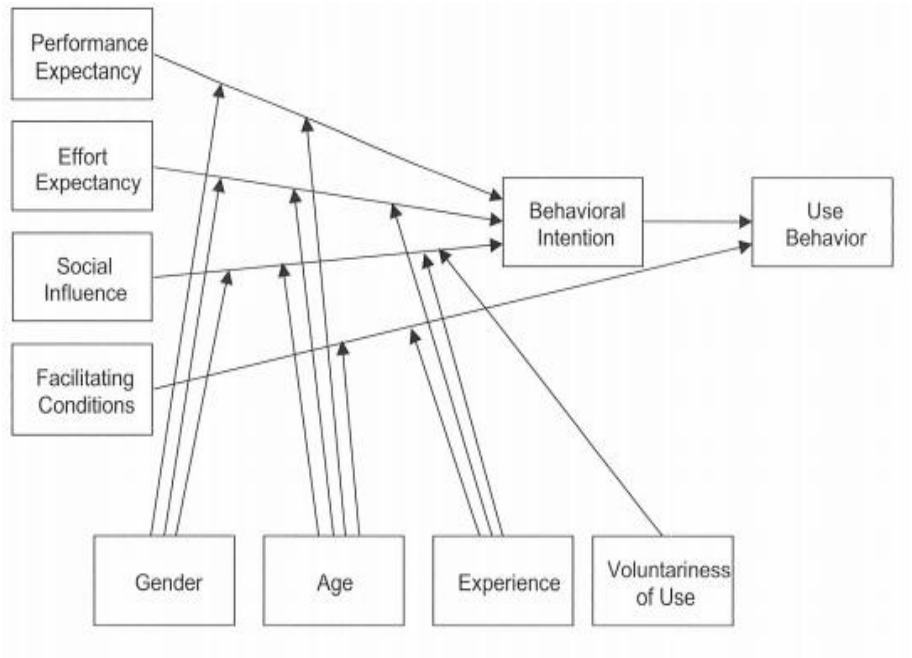

Figure 1. UTAUT model (Venkatesh et al., 2003).

UTAUT did not include Attitude as a determinant of intention. Venkatesh et al. (2003) argued that Attitude has a spurious relationship with intention, which results from the omission of the other key predictors, especially performance expectancy and effort expectancy.

2.4.2 Moderating Factors

In UTAUT there are four moderating factors to the model; Gender, Age, Experience and Voluntariness of Use. Moderating factor Gender affects Performance Expectancy, Effort Expectancy and Social Influence based on UTAUT. Venkatesh et al. (2003) argued, that men tend to be highly task oriented. Women are said to hold Effort Expectancy and Social Influence as more important than men. Venkatesh et al. (2003) highlighted in their study that the differences are not from biological gender per se, but they stem from the gender roles and the socialization process that is reinforced form birth (Venkatesh et al., 2003).

For the moderating factor Age Venkatesh et al. (2003) stated that based on literature, younger workers value extrinsic rewards higher and that age also plays a part in technology adoption context. It has also been suggested, that age might explain gender differences, and depending on the age and traditional gender roles an individual might value job-related factors differently. For the construct facilitating conditions, age is a moderating factor. For older workers facilitating conditions hold a more important role (Venkatesh et al., 2003).

Experience is one of the moderating factors. Based on studies, the influence of Social Influence and Effort Expectancy on Behavioural Intention will decrease when the user gains more experience of using the system. With the construct Facilitating Conditions, the more experience the individual has, the less important role the Facilitating Conditions plays. Voluntariness of Use moderated the construct Social Influence, and Social Influence constructs were insignificant in Voluntary context, but all of them become significant when the usage is mandatory (Venkatesh et al., 2003).

2.5 UTAUT-extensions

Researchers have developed extensions for the UTAUT-model by Venkatesh et al. (2003). In this chapter three UTAUT based models are introduced. These models were chosen because they fit the ERP implementation setting. In 2.5.1 Meta-UTAUT by Dwivedi, Rana, Jeyaraj, Clement & Williams (2019) is introduced. In 2.5.2 ERP extension for UTAUT by Keong, Ramayah, Kurnia & Chiun (2012) is introduced. In 2.5.3 the study by Alshare, Alomari, Lane & Freeze (2019) is introduced.

2.5.1 Meta-UTAUT

META-UTAUT added the factor of Attitude back to the UTAUT-model, which was originally excluded from it. They also found a relation of Facilitating Conditions and Behavioral Intention from the literature. Original UTAUT model left the Attitude-factor out, since the study argued that it only predicts Behavioral Intention if Effort Expectancy was not included in the model. Dwivedi et al. (2019) argue though, that according to literature the influence exists even if the Effort Expectancy is included, and brought the relation back in the model (Dwivedi et al., 2019).

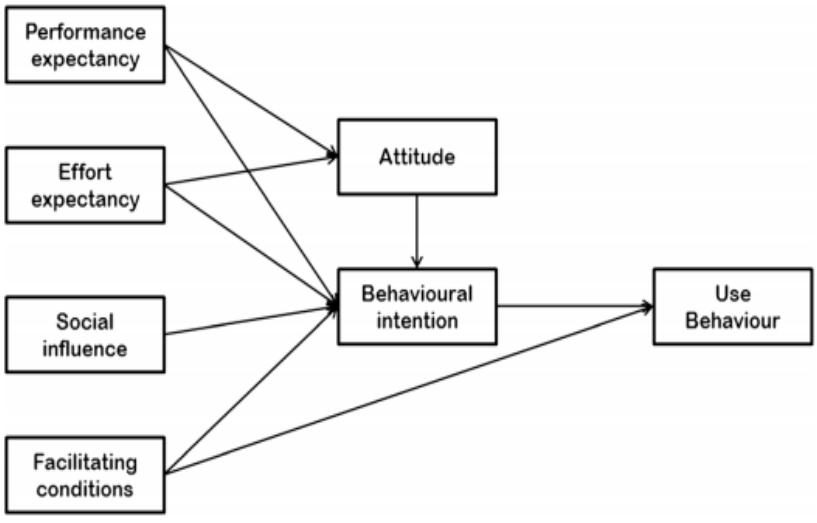

Figure 2. META-UTAUT (Dwivedi et al., 2019).

2.5.2 ERP extension for UTAUT

The UTAUT-extension for ERP implementations by Keong et al. (2012) removed Voluntariness of Use from the moderating factors, and Training, Communication and Shared Belief were used to measure the Facilitating Conditions construct. Experience was excluded from their model (Keong et al., 2012).

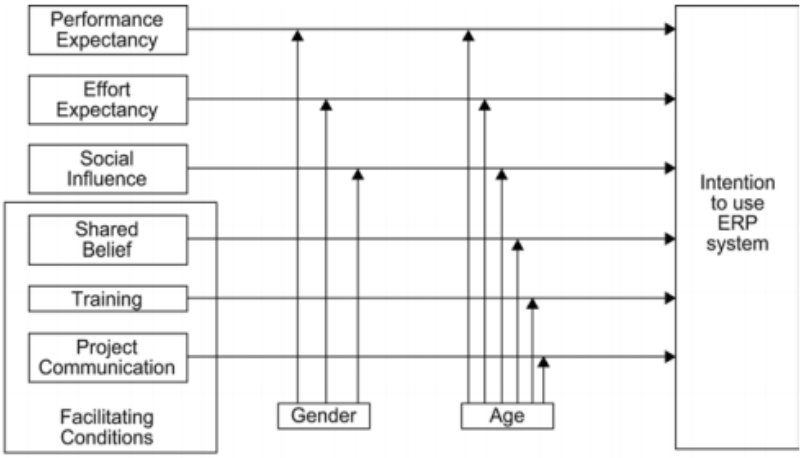

Figure 3. ERP extension for UTAUT (Keong et al., 2012).

ERP implementations are a mandatory setting, which is why the moderating factor Voluntariness of Use was left out from the model. The study by Keong et al. (2012) was carried out as cross-sectional study, which is why Experience was also excluded from the model.

2.5.3 The study by Alshare et al. (2019)

The study by Alshare et al. (2019) was based in UTAUT-model, and the study aimed to predict end-user intention and use of expert systems (ES) by proposing and extended UTAUT model. Attitude was included in their model, since based on literature, end-user's attitude towards the system is a critical factor related to ES usage success (Alshare et al., 2019).

The results of the study confirmed that attitude affects intention, which influences end-user's usage of the expert system. Attitude was affected by both Effort Expectancy and Performance Expectancy. It was more strongly affected by Effort Expectancy than Performance Expectancy, which would implicate that user-friendliness is an important factor for the end-users (Alshare et al., 2019).

Table 1. Characteristics of the models used in UTAUT.

Model	Characteristics
Theory of Reasoned Action (TRA)	Attitude (A) and Subjective Norm (SN) define person's Behavioral Intention (BI), which determines Behavior.
Theory of Planned Behavior (TPB)	Adds Perceived Behavioral Control (PBC) to TRA. PBC = Person's perception of the difficulty or ease to perform behavior reflecting past experiences and anticipations of obstacles.
Technology Acceptance Model (TAM)	Adaptation of TRA, introduces concepts of Perceived Usefulness (PU) and Perceived Ease of Use (PEU).
TAM2	Excludes Attitude-factor from the mode, introduced the concepts of Social Influence Process and Cognitive Instrumental Process.
Motivational Model	Has two concepts: Extrinsic Motivation (the perception of users performing the activity to achieve outcomes distinct from the activity itself) and Intrinsic Motivation (perception of users performing the activity for the process of performing the activity itself).
Model of PC Utilization	The core constructs are Job Fit with PC Use, Complexity of PC Use, Long-Term Consequences of PC Use, Affect Toward PC Use, Social Factors Influencing PC Use and Facilitating Conditions for PC Use.
Innovation Diffusion Theory	Core Constructs are Relative Advantage, Ease of Use, Image, Visibility, Compatibility, Results Demonstrability and Voluntariness of Use.
Social Cognitive Theory	Behavior, Environment and Person affect each other. 5 core concepts; Outcome Expectations Relating to Performance, Outcome Expectations Relating to Persona, Self-Efficacy, Affect and Anxiety.

In Table 1 the characteristics of the models which form the base for the UTAUT model are presented in the form of a table to give a simple view of the models. Many of these models stem from the research in psychology, and newer models are adapted from the older ones (Venkatesh et al., 2003).

Table 2. Characteristics of different UTAUT-models.

Model	Characteristics
Unified Theory of Acceptance and Use of Technology (UTAUT)	Adapts from the other 8 models. The model has four constructs that have direct effect to acceptance and behavior; Performance Expectancy, Effort Expectancy, Social influence and Facilitating Conditions. It also has moderating factors; Gender, Age, Experience and Voluntariness of Use.
Meta-UTAUT	Adds the factor Attitude back to the UTAUT-model, and adds a relation between Facilitating Conditions and Behavioral Intention
ERP extension for UTAUT	Removed Voluntariness of Use from the model due to the ERP-implementation setting. Training, Communication and Shared Belief were used to measure the Facilitating Conditions construct. The moderating factor Experience was excluded from the model due to the research setting.
UTAUT-study by Alshare et al. (2019)	Incldes Attitude back to UTAUT-model, and the results confirmed that Attitude affects Intention, which influences end-user's usage of the expert system. Attitude was affected by both Effort Expectancy and Performance Expectancy.

In Table 2 the characteristics of the different UTAUT models are presented in the form of a table. The ERP extension (Keong et al. (2012) discusses UTAUT-model in ERP-environment, while Meta-UTAUT (Dwivedi et al., 2019) and the UTAUT-study by Alshare et al. (2019) discuss if the Attitude factor needs to be included in the model.

2.6 Attitude as a debated construct

Technology has also socially constructed side, which means that people tend to attach different meanings to technology, and create attitudes towards it. These meanings affect the feelings towards the technology itself, and therefore how people behave with it (Abdinnour-Helm, Lengnick-Hall, Lengnick-Hall, 2003). In this chapter the construct of attitude is introduced more closely. In 2.6.1 the construct of attitude is defined. In the chapter 2.6.2 the support for including the factor in to the model is introduced. In the chapter 2.6.3 the implications of attitude in ERP implementation context are introduced.

2.6.1 Defining the construct

The factor "Attitude" can be divided further to two different factors; Attitude of the top management toward IT adoption, and the Attitude of end users (Ghobakhloo, Hong, Sabouri & Zulkifli, 2012). Different groups within an organization may have different social constructions of the same technology, and therefore the implementation project may seem very different to a manager than it looks like to an end user working on a production line (Abdinnour-Helm et al., 2003).

The study by Nah, Tan & Teh (2004) provided support for the belief that Attitude and Symbolic Attitude are two distinct constructs. The study also suggests that Behavioral Intention might not be the proper criterion variable, but "Symbolic Adoption" would be better when the use is mandatory, as it is in ERP use. Symbolic Adoption is defined as

"the degree of voluntary mental acceptance of the idea component of an IT innovation" (Nah et al., 2004).

2.6.2 Support for including Attitude to the model

Attitude can be seen as one of the most important factors in ERP implementation projects, since end user's reluctance to use the new system is one of the most commonly cited factor for ERP failures (Nah et al., 2004). If the people have a negative attitude towards the implemented technology, the technology may only have a little impact on an organization after the implementation (Abdinnour-Helm et al., 2003).

Attitude is mediating four cognitive constructs of IT adoption: perceived usefulness, perceived ease of use, perceived compatibility and perceived fit, of which especially perceived compatibility and perceived ease of use have both direct and indirect effects. (Nah et al., 2004). The concepts of perceived ease of use and perceived usefulness were introduced in TAM, which states that individual's behavioral intention is determined by these two beliefs. The terms are defined as following; perceived usefulness is seen as the extent to which person believes that using the system will enhance their job performance, and perceived ease of use is seen as the extent to which the user believes that using the system will be free of effort (Davis, 1989). The perceived compatibility factor is derived from Roger's theory of Diffusion of Innovations, and in ERP this factor can be seen as the degree to which the ERP system is perceived to be consistent with the existing business processes. The fourth construct, perceived fit, can be seen as the degree to which the ERP software is perceived by a user to meet their organization's needs. Possible misfits can occur in data, functionality or output (Nah et al., 2004).

The fact if Attitude is connected to Behavioral Intention or Behavior in mandatory adoption environment is not clear. Some studies state that Attitude is not related to Behavioral Intention in mandatory setting (Brown, Massey, Montoya-Weiss & Burkman, 2002), while some studies support the relation (Barki & Hartwick, 1994). Whether or not it is connected straight to Behavioral Intention or straight to behavior, the role of Attitude in mandated environment is still important, and excluding it would not provide an accurate picture of users' IT acceptance (Nah et al., 2004).

There is still contradictory information about the effect of attitude in mandatory setting. In Staples & Seddon's study (2004) no link was found between beliefs and affects towards use in mandatory setting. The study tested Goodhue's and Thompson's proposed Technology-to-Performance Chain (TPC) model from 1995 (Staples & Seddon, 2004). On the other hand, the study by Hwang, Chung, Shin & Lee (2017) showed that Attitude has a significant affect to goal commitment in system implementation in mandatory use setting. Nah et al. (2004) concluded that the mixed findings may be due to the non-shared definition of the construct "Behavioral Intention" construct.

2.6.3 Implications of attitude in ERP implementation context

Hierarchical level seems to affect the attitude towards ERP implementation, and managers seemed to be more positive towards ERP implementation in the study by Abdinnour-Helm et al. (2003). The attitude of top management affects other factors that are important for the implementation; how committed they are, what is the level of support for the project and how much resources are given for the project. According to

studies positive attitudes of top management relates to the success of IT adoption (Ghobakhloo et al., 2012).

End user attitude has been linked to system acceptance and adoption success; when users have positive attitude towards the system and implementation, the implementation is more likely to succeed (Ghobakhloo et al., 2012). End user reluctance or unwillingness to use the new system is a serious threat to the project, and it has been often cited as one of the main contributors to a failed ERP implementation project (Nah et al., 2004). In some cases employees might be afraid that they will lose their jobs after the implementation, and that might create negative attitudes towards the implementation. Open organizational culture has been found to encourage positive attitude towards organizational change which occurs due to ERP implementation (Ghobakhloo et al., 2012). Even though it is important to try to keep the end users positive about the system, overselling the new system to the might also cause doubts among the workers (Abdinnour-Helm et al., 2003).

In the study by Abdinnour-Helm et al. (2003) attitudes toward ERP system implementation were not affected by exposure to the ERP system and involvement in the pre-implementation trainings with consultants, and it was suggested that the employees saw the implementation as just another management effort that "looked good on paper", and that it would be abandoned in the end. This affects commitment to the project, and the implementation project in the study by Abdinnour-Helm et al. (2003) was viewed as less than satisfactory, and the company continued to have problems with realizing ERP's full potential (Abdinnour-Helm et al., 2003).

In an implementation project, attitude can also be affected by how long the employee has been working in the company. Newer employees seem to be more accepting towards new information systems. Also, new employees might not have experienced ERP implementation projects before, and therefore do not have a negative attitude formed towards those projects (Abdinnour-Helm et al., 2003).

Users' attitude towards technology can change over time, and the attitude can be affected with different actions (Bhattacherjee & Premkumar, 2004). Also in ERP implementation employee's attitude towards the new system may change during and after the project. Before the employees have had on-hand experiences of the new system, the experiences may be based on a few attributes, past experiences and second-hand learning. These pre-implementation attitudes may act as starting points and shape behavior and beliefs later on (Abdinnour-Helm et al., 2003).

3. Research methods

This study uses Design Science research as the research method. The research method was chosen due to the suggestion of the thesis supervisor. In design science research, a new artifact is being designed, which is a relevant technology-based solution to a known problem (Hevner, March, Park & Ram 2004). In this chapter the research method is discussed and explained how it has been applied in the study. Also the literature review and empirical research is introduced.

3.1 Design Science Research

The Platonic view of design science research views the design as both a process and a product. Design science research is a problem solving process, and it describes the world as acted upon, via its processes, but also as the world is sensed, via artifacts. Differing from behavioural science, which has its goal in finding the truth, design science research aims for utility. Truth and utility are inseparable, but even if an artifact has some of its truth undiscovered at the time, the artifact may still have utility (Hevner et al., 2004).

The goal for design science is to create and evaluate IT artifacts, such as models and methods which are represented in a structured form. These artifacts are intended to solve identified problems in organizational setting. A product, the artifact, is produced with the design process, which is a sequence of expert activities. The artifacts may be constructs, models, methods or instantiations (Hevner et al., 2004).

According to Hevner et al. (2004), the guidelines for design science research are following:

1. **Design as an Artifact**
   The result of the design science research is a purposeful artifact, which is created to address a known problem in organizational context.
2. **Problem relevance**
   In Design science research the goal is to gain knowledge and understanding to enable the development of the artifact. Problem can be defined as a difference between the current state, and the goal state. The problem can be affected by using actions to reduce or eliminate the differences between these two states.
3. **Design Evaluation**
   Artifact's utility, quality and efficacy must be demonstrated with well-executed evaluation methods. Rigor must be applied.
4. **Research contributions**
   The design science research process must provide clear contributions, either in as the artifact itself, as design construction knowledge or as design evaluation knowledge.
5. **Research Rigor**
   Rigor must be applied in the methods of constructing and evaluating the designed artifact.

6. **Design as a search process**
   Design process is iterative in nature, and it is a search process to discover an effective solution to a known problem. The design can be implemented in business environment.
7. **Communication of research**
   Design science research must be communicated to both technology oriented and management oriented audiences.

This study follows the guidelines of design science research. An artifact, in this thesis the model, is created to solve an identified problem in organizational context (Guideline 1), which reduces the differences between the current state of the system and the goal state of the system (Guideline 2).

In Design Science Research the result is a purposeful artifact (Hevner et al., 2004). In this thesis the artifact was the model created. The model was formed based on the literature review, and the UTAUT-model by Venkatesh et al. (2003) was used as the basis, since it united the models which had been used to explain user's technology usage and acceptance so far. The UTAUT-model was reviewed using newer research and with the empirical study conducted in this thesis.

The artifact is evaluated rigorously with descriptive evaluation (Guideline 3). The use of descriptive evaluation was chosen because the Covid-19 pandemic of the year 2020 made it difficult to test the model in a real environment, and it would have postponed the thesis. Luckily, there is a possibility to test the model in a real environment in 2021, and therefore an observational study will be done later on.

The research contribution is the artifact, which extends the existing knowledge base (Guideline 4). Rigor has been applied in the methods of the study (Guideline 5). The design process of the study is iterative, and it builds on existing knowledge and the design can be implemented in business environment (Guideline 6). The thesis is published in "Jultikka", and therefore communicated to audience (Guideline 7).

3.2 Literature Review

Literature review was conducted to see the current state of the research. Abstract and indexing research database Scopus was used to search existing research papers related to the research topic.

Following search criteria was used:
Enterprise Resource Planning / ERP
(Enterprise Resource Planning / ERP) Implementation
Technology Acceptance
Theory of Reasoned Action
Theory of Planned Behavior
Motivational Model
Model of PC Utilization
Innovation Diffusion Theory
Social Cognitive Theory
Unified Theory of Acceptance and Use of Technology / UTAUT
Technology Acceptance Model / TAM
Attitude
UTAUT and ERP

The papers used in the literature review were chosen based on their relevance. For the models the original papers introducing the model were selected if they were available. Those extensions of UTAUT were selected which were extending the usage of UTAUT to ERP setting.

3.3 Empirical Research

Empirical research was conducted in the form of a survey. Survey was conducted in 2019 in a multinational company, which had previously implemented an ERP system. Survey was available for all employees which had worked during the implementation project. Survey's purpose was to understand end users' feelings and viewpoint after ERP implementation project. In total 274 users participated in the survey, and of which 239 were taken into account, because only the answers of participants who were working in the company during the implementation were counted. The company had approximately 3000 employees at the time of the implementation.

The survey gives both quantitative and qualitative data. Quantitative data can be gained from the statistics and correlations of the answers. Qualitative data can be gained from the open answers. The questions were based on prior research of the field, and approved by the thesis supervisor and also by the company's ERP implementation project manager and the communications manager.

The survey questions were formed based on three different articles (Umble et al., 2003; Amoako-Gyampah, 2007; Jackson, Chow & Leitch 1997). The survey questions can be seen on Appendix A. The survey is explained more in-depth in chapter 5.

4. Proposed model

In this chapter a model is proposed based on previous literature. In 4.1 the factors of the model are discussed based on the literature. In 4.2 the moderating factors are discussed based on the literature. In 4.3 the constructs of Behavioral Intention and Behavior are discussed based on literature.

4.1 Factors

The four constructs of UTAUT, Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions have been taken into the proposed model. UTAUT has unified the core constructs of the previous models successfully.

Performance Expectancy, "the degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh et al., 2003), has been accepted as a construct in all the literature that was found for this study. Therefore the construct is also taken in to the proposed model with the same definition as Venkatesh et al. (2003) stated.

Effort Expectancy, "the degree of ease associated with the system use" (Venkatesh et al., 2003), is also taken into the proposed model. Venkatesh et al. (2003) stated, that it is also significant in mandatory use, but turns to non-significant over time when the system use is sustained and extended. In the literature found for this study there was no opposition for this.

Social Influence, "the degree how an individual believes the important ones think he or she should use the system" (Venkatesh et al., 2003), was also accepted as a construct in the literature reviewed. It was also said to be especially significant when the use is mandatory, and in ERP implementations the usage for the users is mandatory. In sustained use Social Influence becomes non-significant, but before, during and right after the implementation project it is expected to be especially significant.

Facilitating Conditions, "the degree which an individual believes that these infrastructures exist to supports their system use" (Venkatesh et al., 2003), was also widely accepted in the literature reviewed for this study. Venkatesh et al. (2003) stated, that Facilitating Conditions was a direct determinant of use behavior, not behavioral intention. Keong et al. (2012) included also training, communication and shared belief in Facilitating Conditions –factor. Dwivedi et al. (2019) found a relation between Facilitating Conditions and Behavioral Intention from the literature.

Even though Attitude was left out from the original UTAUT, it was added back to the model in Meta-UTAUT (Dwivedi et al., 2019). Dwivedi et al. (2019) argued that according to the literature the link between attitude and behavioral intention exists even if the Effort Expectancy –factor is included in the model. Also Alshare et al. (2019) included Attitude as a factor in their UTAUT-based model, and they based their decision in the existing literature. In their study it was confirmed, that attitude affects intention, and that attitude is affected by Effort Expectancy and Performance

Expectancy (Alshare et al., 2019). There was also lots of support to include Attitude in technology acceptance models in the literature (Nah et al., 2004; Abdinnour-Helm et al., 2003; Ghobakhloo et al., 2012), but there was debate if Attitude is connected to Behavioral Intention or Behavior (Brown et al., 2002; Hartwick & Barki, 1994). According to Nah et al. (2004) Attitude can still not be excluded from the models, since it's role is important in mandated setting, and leaving it out would not give the full picture of the IT acceptance of a user.

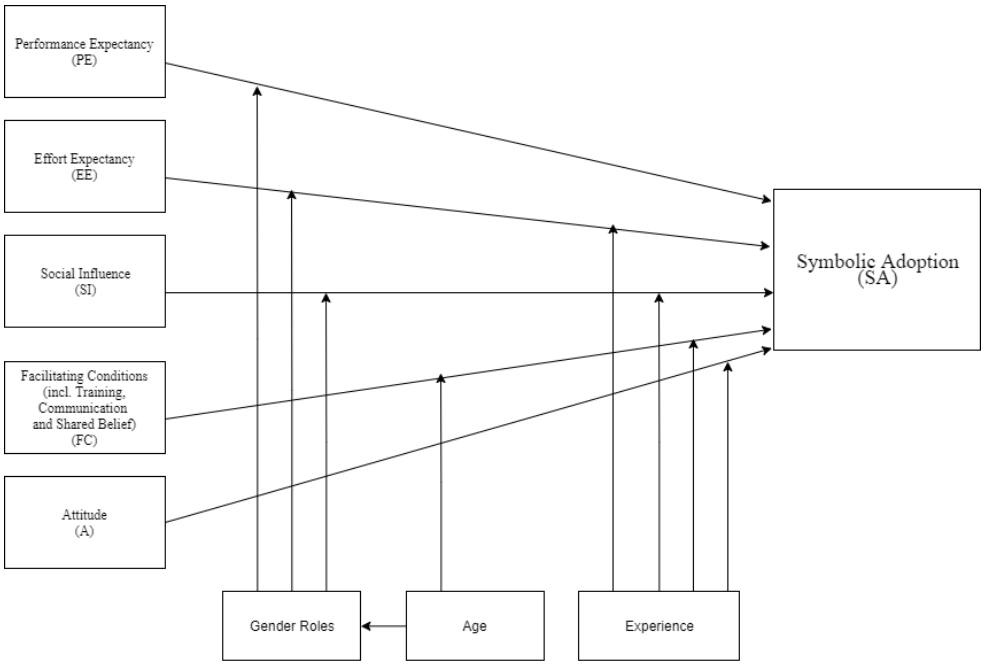

Figure 4. Proposed model

In Figure 4 the proposed model of this study is presented. The factors of the model are based on the previous research discussed in chapter 2.

4.2 Moderating factors

In UTAUT Gender as a moderating factor was said to affect performance expectancy, effort expectancy and social influence. Venkatesh et al. (2003) highlighted though, that the differences between "genders" are from gender roles, and not the biological sex. It was also stated, that the gender roles might change, which then affects the moderating factor. The role of gender was not questioned in the literature reviewed. To be clear of the definition of the word "gender" and highlight the meaning of the term, in the proposed model the moderating factor Gender will be referred as "Gender Roles".

Age as moderating factor was said to moderate facilitating conditions and the moderating factor "gender" (Venkatesh et al., 2003).

Experience as a moderating factor is linked in Social Influence, Facilitating Conditions and Effort Expectancy, in the way that these factors become less significant with increasing experience on the system (Venkatesh et al., 2003). The role of Experience was recognized in the literature reviewed, and it was not opposed. Keong et al. (2012) left the Experience out from their model, but that was due to the research setting they had in their work.

In the study by Abdinnour-Helm et al. (2003) attitude was found to be affected by experience, meaning that newer employees seemed to be more accepting towards the new system than old employees. Old employees might have negative experiences from old ERP system implementations, which would lead to negative attitudes. This means that attitude is not just modified by Experience, but affected by it.

Voluntariness of use as moderating factor does not apply in ERP implementation projects or ERP usage, since the use is mandatory by default. Keong et al. (2012) removed the Voluntariness of use –factor from the model, since users do not have choice in organization's ERP implementation setting.

4.3 Behavioral Intention and Behavior

The concepts of Behavioral Intention and Behavior might not suit well in the technology adoption models, when the use is mandatory. Nah et al. (2004) suggested, that in mandatory setting "Symbolic Adoption" would be a better construct. Symbolic Adoption is defined as "the degree of voluntary mental acceptance of the idea component of an IT innovation" (Nah et al., 2004).

The meaning of the construct "Behavioral Intention" seems not to be shared throughout the research field. There have been contradictory results if certain factors affect the Behavioral Intention in mandatory setting (Staples & Seddon, 2004; Hwang et al., 2017). Nah et al. (2004) suggested, that this is due to the non-shared definition of the construct Behavioral Intention.

There is debate if Attitude is connected to Behavioral Intention or Behavior between different research papers (Brown et al., 2002; Hartwick & Barki, 1994), but the role in mandated environment is still important (Nah et al., 2004). The reasons mentioned above support the unification of the factors "Behavioral Intention" and "Behavior" to "Symbolic Adoption" when modeling users' technology acceptance and usage in ERP implementation setting.

5. Conducting the empirical research

The study was carried out in a global electronics manufacturing services (EMS) company, which implemented IFS 7.5 on its several sites during the years 2014-2018. The company had approximately 3000 employees at the time of the last implementation. The name of the company is withheld due to a non-disclosure agreement. Sites are in different parts of the world on different continents; Europe, Asia and North America.

Before IFS 7.5 the company had different softwares in use. The main softwares which IFS was supposed to cover were an MRP-system and a software that was used in the financial department.

IFS 7.5 was chosen from multiple candidates of ERP systems. The suitability for the business processes and functionality, modern user interface, the stage of the system life cycle, that other companies in the same field use the system to prove the fit for the field, support for the languages of the company's sites, system supplier's solvency and the estimated overall costs of the project including license fees, support, implementation support and the needed time window for the implementation were mentioned as the factors which affected the decision. The company was going to implement a newer version of IFS, IFS 10, to all its sites in 2019, and this survey was also used to give guidance what factors should be taken into account in order to learn from the previous implementation.

The survey was both quantitative and qualitative. Some of the questions had different options for answering and some of them had an open answer, from which we also aqcuire qualitative data. In total 274 users participated in the survey, and 239 number of results were counted, because only the answers of participants who were working in the company during the implementation were counted.

In this chapter the survey is first introduced in 5.1., the survey questions described in 5.2., then the results are described by site in 5.3., and last in 5.4. the results are presented in the form of tables.

5.1 Survey

The questionnaire was based on three different articles (Umble et al., 2003; Amoako-Gyampah, 2007; Jackson, Chow & Leitch 1997). The questions were made and tested during the end of year 2018 and January 2019. The questions were checked by Mikko Rajanen from the University of Oulu, and also by the head of the ERP project and the director of Group Marketing and Communications from the company the survey was held on.

The questions were translated by each site's ERP-system key users. They were explained in a Skype-meeting to the translators in order to reduce the risk of translation errors. After translated, the questions were tested to be understandable by each site, and modified according to the results.

On site 1 the questions were tested by one line worker, one person from the human resources department and one from the middle management. The word “ERP” was changed to the term on the local language, which was agreed to be more understandable to the participants. On site 2 questions were tested on three employees, by one from the office, by the leader in production and by a line worker. The person from the office did not understand at first who was the supervisor, the line leader in production did not understand what is meant by attention in the question 24, and the line worker had problems at the first question. On site 3 the questions were tested by two employees, the production manager, and an IT-employee. The translators from the site made modifications in the translations by the comments of the testers. On site 4 questions were tested in the local site, and the testing was organized by the site’s key user, who had translated the questions. The translator made modifications to the questions according to the tests. On site 5, 6 and 7 the survey questions were tested on site, but no changes were made.

The survey was published on 23.1.2019 on company’s intranet as a Sharepoint survey. Also paper versions of the survey were distributed for those, who did not have their own computer. Additional paper versions were added, since it was thought, that a computer meant for answering survey could easily be crowded, and that could affect the answers.

Information about the survey was distributed on company’s Intranet, which was meant to motivate people to answer the survey. The intranet update was published on 21.1., and on 23.1. the links for different translations and an informative text was sent to everyone working in the company. In the mail it was asked to everyone who use IFS 7.5, have own user account or who use commonly used user accounts, and who were working in the company during the implementation of IFS 7.5 to answer the survey. To avoid misunderstandings, it was also highlighted, that those who only use other systems in the company, do not have their own account or do not use commonly used user accounts, or were not working in the company during the implementation IFS 7.5 do not need to answer to the survey.

5.2 Survey questions

The survey had 31 questions. Some of the survey’s questions had pre-given options for answering (Yes / No / I do not know / I do not remember / other question related answer option) and some of them had a field for free answer.

At first participants were asked on which site they worked in, on which department, and if they worked in the company during the implementation project. The questions were divided in four different categories (communication, process changes, trainings and support), and in the end more vague questions about the project were asked.

Communication-section had questions where the participants were asked if they understood why the IFS 7.5 ERP-system had been implemented on their site, to describe the reasons in their own words, and about their expectations before the implementation project took place.

Process Change-section had questions where the participants were asked if their work processes were changed during the implementation, if they understood why their work processes were changed during the implementation project, how did they feel about it, how well they think the IFS 7.5 system fit their work processes and if they felt that they got enough support during the changes.

In the questions considering Trainings the participants were also asked about the trainings; if they got any, if it was sufficient, what kind of training they got, if they had time to participate and what more would they have wished from the trainings.

The questions about Support covered the area where the participants were asked if they thought that the management supported the project enough with resources, and also to describe in which ways did they think they supported the project, and also if they felt that their own supervisor supported them in the project, and if they felt that the project was taken into account when their work was being scheduled and if they thought their site got enough attention in the project.

Lastly, participants were asked about their overall feeling of the project, if they thought it was successful, what would have helped them in their work during the project and what they thought would have helped the project itself, and if they had any additional comments and what did they wish was taken more into account in the next ERP implementation project on their site.

In the intranet survey participants had to answer to the questions which had pre-given options for answering in order to proceed, but the open answers could be left blank. In the paper versions some of the participants left some of the questions blank, which were obligatory to answer in the intranet version.

5.3 Results of the survey

In this chapter the results from the survey are presented. The results are divided by site and global workers have their own category "Global". In total 274 users participated in the survey, and 239 of them were taken into account, since those were made by employees who were working in the company during the implementation project. All users were instructed to participate on all sites if they were working in the company during the implementation project. The percentages are rounded to full digits. Some of the results have also been cross-referred from the actual survey results, measuring how many participants who had a certain answer in question X had a certain answer in question Y. If the answer field has a "-" sign, it means that the parameters given in the question are not fulfilled in that specific question in that specific site, so the data does not exist for that specific question.

The amount of participants on each site are summed in Table 3. In some sites all of the received answers were not count, since the participant was not working in the organization during the implementation.

Table 3. Answer rates per site.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global	Total
Answers	59	66	21	53	33	18	14	10	274
Answers which were count	49	57	19	53	30	9	12	10	239

In Table 4 the results for the percentages of the participants who felt they understood why the system was implemented are presented site by site. The percentage varied from 53% to 100%. In site 2 the percentage was the lowest, 53%, and on site 6 had the highest, 100%.

Table 4. Percentage of the participants who felt they understood why the system was implemented.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% participants understood why the system was implemented	79 %	53 %	89 %	58 %	73 %	100 %	75 %	90 %

In Table 5 the percentages of the participants who had positive expectations about the upcoming project are presented site by site. The feeling of the successfulness of the project among these participants is also presented. In most of the sites the amount of the participants who had positive expectations about the upcoming implementation was highest. Most of those who had positive expectations also felt the project was in the end successful in all of the sites.

Table 5. The relation between positive expectations and the feeling of outcome.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% had positive expectations	39 %	44 %	100 %	49 %	47 %	56 %	67 %	90 %
Those who had positive expectations % thought the project was successful in the end	32 %	36 %	53 %	58 %	79 %	80 %	89 %	44 %
Those who had positive expectations % had a mixed opinion about the successfulness in the end	16 %	28 %	16 %	4 %	7 %	0 %	0 %	22 %
Those who had positive expectations % thought the project was not successful in the end	5 %	12 %	5 %	0 %	0 %	20 %	0 %	22 %

In Table 6 the percentages for those who had no expectations about the upcoming project are presented. The rate for no expectations varied from 0% to 47%. Among those who had no expectations the feeling of successfulness seems to be more divided, but apart from Site 1 the feeling of successfulness seemed to be slightly more positive than mixed or negative.

Table 6. The relation between neutral expectations and the feeling of outcome.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% had no expectations	47 %	47 %	0 %	32 %	47 %	44 %	25 %	10 %
Those who had no expectations % thought the project was successful in the end	9 %	41 %	-	29 %	29 %	25 %	67 %	0 %
Those who had no expectations % had a mixed opinion about the successfulness in the end	13 %	33 %	-	24 %	14 %	25 %	0 %	0 %
Those who had no expectations % thought the project was not successful in the end	17 %	4 %	-	0 %	0 %	50 %	0 %	0 %

The rate for negative expectations varied from 0% to 19%. In Table 7 the percentages for those who had negative expectations about the upcoming project are presented. The amount of those who had negative expectations was lowest of these three groups in all sites. Surprisingly, here negative expectations do not seem to correlate with the negative feeling of successfulness. Site 1 was the only site where the participants who had negative expectations also had negative feeling of the successfulness after the implementation.

Table 7. The relation between negative expectations and the feeling of outcome.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% had negative expectations	12 %	9 %	0 %	19 %	7 %	0 %	8 %	0 %
Those who had negative expectations % thought the project was successful in the end	17 %	40 %	-	20 %	50 %	-	100 %	-
Those who had negative expectations % had a mixed opinion about the successfulness in the end	17 %	40 %	-	20 %	0 %	-	0 %	-
Those who had negative expectations % thought the project was not successful in the end	17 %	0 %	-	0 %	0 %	-	0 %	-

On all sites some of the work processes were changed. The results for the part "Processes" are presented in Table 8. The percentage varied between 37% and 95%. In none of the sites all of the participants understood why the changes were made, and the percentage for that varied from 38% to 84%. Overall, there does not seem to be any big differences in understanding the process changes depending on if the participant's work processes were or were not changed. Only in site 7 and among the global employees there is a bigger difference depending if the participant's work processes were changed.

Table 8. Process changes.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% reported that their work processes were changed	49 %	75 %	95 %	49 %	37 %	78 %	58 %	80 %
% understood why the process changes were made	61 %	42 %	84 %	38 %	40 %	67 %	58 %	80 %
Of those whose work processes were changed % understood why the changes were made	54 %	47 %	83 %	42 %	45 %	57 %	86 %	100 %
Of those whose work processes were not changed % understood why the changes were made	63 %	50 %	-	29 %	50 %	100 %	33 %	0 %

Over half of the participants on all sites felt that the ERP system fits to their work processes, and the percentage varied from 56% to 100%. In some sites those employees who received training felt more that the system fits their work processes compared to those who did not receive training, but in some sites those who did not receive training

felt more that the system fits their processes. In Table 9 the results of system fit towards the work processes are presented.

In site 3 the difference is the most noticeable, and there 94% of those who received training felt the system fits their processes, and 33% of those who did not receive training felt that the system fits their processes. Interestingly on site 6 and among the global personnel, more of the participants who did not receive training felt that the system fits their work processes than of those who did receive the training. Among those whose processes were changed the difference between those who received training and who did not receive training starts to get more visible, and here the fact if participant received training seem to affect more almost on all sites.

Table 9. Feeling of system fit towards the work processes.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% felt the ERP system fits their work processes	92 %	68 %	84 %	62 %	77 %	56 %	100 %	80 %
Those who received training % thought ERP fits their work processes	100 %	71 %	94 %	91 %	78 %	33 %	100 %	75 %
Those who did not receive training % thought ERP fits their work processes	83 %	71 %	33 %	56 %	83 %	50 %	100 %	100 %
Those whose processes were changed and received training thought ERP fits their work processes	100 %	69 %	93 %	100 %	67 %	67 %	100 %	75 %
Those whose processes were changed and did not receive training thought ERP fits their work processes	100 %	50 %	33 %	57 %	50 %	50 %	100 %	-

In all sites but one there were more participants who reported that the supervisors and management supported them enough during the process changes than those who reported they did not get enough support. The feeling of supervisors and management supporting enough varied between 11% and 95%. The feeling of being not supported enough varied between 5% and 44%. In site 3 the feeling of being supported enough was the highest and feeling not supported was the lowest, and in site 6 the feeling of being supported was the lowest, and feeling of being not supported was the highest. In Table 10 the results of feeling supported by the supervisors and management are presented.

In all of the sites those whose work processes were changed felt less supported by the supervisors and management. Those participants whose work processes were changed and who received training clearly felt more supported than those whose work processes

were changed, but who did not receive training. Only in site 4 those who did not receive training felt more supported.

Table 10. Feeling of being supported by the supervisors and management.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% felt supervisors and management supported them enough during process changes	39 %	54 %	95 %	68 %	37 %	11 %	83 %	50 %
% felt supervisors and management did not support them enough	29 %	23 %	5 %	8 %	10 %	44 %	8 %	30 %
Those whose work processes were changed % felt they got enough support from supervisors and management	46 %	63 %	94 %	65 %	64 %	14 %	86 %	50 %
Those whose work processes were not changed % felt they got enough support from supervisors and management	25 %	33 %	-	62 %	21 %	0 %	67 %	0 %
Those whose work processes were changed and received training % felt they got enough support from supervisors and management	71 %	69 %	100 %	60 %	100 %	33 %	100 %	50 %
Those whose work processes were changed but did not receive training % felt they got enough support from supervisors and management	0 %	0 %	67 %	64 %	0 %	0 %	0 %	-

In Table 11 the results for the questions of feeling supported with resources and if the site was supported enough are summed. The feeling if the management supported the project with enough resources varied from 20% and 92%, and the feeling that they did not support enough varied between 0% and 56%. Only in site 7 0% felt the management did not support the project with enough resources. Also, only in site 7 % answered that their site did not get enough attention during the project. Otherwise the percentage of those who felt their site got enough attention varied from 27% to 89%, and the percentage of those who felt their site did not get enough attention varied from 0% to 35%.

Table 11. Feeling of supporting with resources and the site.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% felt that the management supported the project with enough resources	22 %	28 %	74 %	42 %	40 %	33 %	92 %	20 %
% felt that the management did not support the project with enough resources	45 %	35 %	21 %	19 %	23 %	56 %	0 %	40 %
% felt their site got enough attention during the project	27 %	30 %	68 %	45 %	63 %	89 %	75 %	60 %
% felt their site did not get enough attention during the project	24 %	35 %	16 %	19 %	13 %	11 %	0 %	20 %

The feeling of being supported enough by employee's own supervisor during the project varied between 51% and 92%, and the feeling of not being supported enough varied between 8% and 43%. The results of feeling supported by employee's own supervisor are summed in Table 12. In some sites the feeling was more divided, and for example on sites 1 and 2 nearly half felt that they were supported enough, and nearly half felt that they were not supported enough. In other sites the clear majority felt that they were supported enough by their own supervisor. Similar percentages can be seen in the answers when added the factor if participant's work processes were changed.

Table 12. Feeling of being supported by participant's own supervisor.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% felt they got enough support from their own supervisor during the implementation	51 %	53 %	89 %	79 %	70 %	67 %	92 %	80 %
% felt they did not get enough support from their own supervisor during the implementation	43 %	42 %	11 %	21 %	30 %	33 %	8 %	20 %
Those whose work processes were changed % felt they got enough support from their own supervisor	46 %	56 %	89 %	85 %	73 %	57 %	86 %	75 %
Those whose work processes were changed % felt they did not get enough support from their own supervisor	46 %	42 %	11 %	15 %	27 %	43 %	14 %	25 %

The percentage of those who received training varied from 30% to 84%. Only among the global personnel all of those who had their work processes changed also received training. The amount of those who did not receive training varied from 8% to 51%. Only on site 2 anyone declined from offered training, the percentage of those who declined being 4%. The results can be seen in Table 13.

Table 13. Training received.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% received training	51 %	74 %	84 %	21 %	30 %	33 %	67 %	80 %
% did not receive training	24 %	12 %	16 %	51 %	20 %	44 %	8 %	20 %
% declined from the training	0 %	4 %	0 %	0 %	0 %	0 %	0 %	0 %

Of the participants whose processes were changed 19% to 100% reported to have received training depending on the site. Only among the global employees the percentage was 100%. The percentage of those whose work processes were changed and who reported not to have received training varied from 0% to 57%. Only in site 2 2% of those whose work processes were changed declined from the training.

When looking at the percentages among those who received training, on all sites 45% or more of these had their work processes also changed. The percentage of these varied between 45% and 100%. Among those who did not receive training 0% to 100% had their work processes changed. Only among the global employees 0% of those who did not receive training had their processes changed, but on site 3, 6 and 7 100% of those who did not receive training had their processes changed. The results for these can be seen in Table 14.

Table 14. Training received compared to the changes in work processes.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
Those whose work processed were changed % received training	58 %	84 %	83 %	19 %	55 %	43 %	86 %	100 %
Those whose work processes were changed % did not receive training	29 %	9 %	17 %	54 %	18 %	57 %	14 %	0 %
Those whose work processes were changed % declined the training	0 %	2 %	0 %	0 %	0 %	0 %	0 %	0 %
% of those who received training had their work processes changed	56 %	86 %	94 %	45 %	67 %	100 %	75 %	100 %
% of those who did not receive training had their work processes changed	58 %	57 %	100 %	52 %	33 %	100 %	100 %	0 %

The results of feeling if training was sufficient can be seen in Table 15. The percentage of feeling the training was sufficient varied between 39% and 92%. Of those who received training the percentage varied between 50% and 100%, and among those who did not receive training it varied between 0% and 50%. Of those whose work processes were changed and who also received training 43% to 100% felt that the training was sufficient.

Table 15. Feeling if training was sufficient.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% thought training was sufficient	39 %	54 %	74 %	53 %	63 %	44 %	92 %	50 %
% of those who received training thought the training was sufficient	52 %	67 %	81 %	82 %	100 %	67 %	100 %	50 %
% of those who did not receive training thought the training was sufficient	0 %	0 %	33 %	33 %	17 %	0 %	0 %	50 %
Those whose work processes were changed and received training % felt the training was sufficient	43 %	64 %	80 %	60 %	100 %	67 %	100 %	50 %

The percentage of employees who felt they had enough time to participate in the trainings varied from 26% to 89%. The amount of those who felt they did not have enough time to participate in the trainings varied from 11% to 26% depending on the site. In all sites more participants reported that they had enough time to participate in the trainings, except in site 4 the percentage of those who had enough time and who did not have enough time was both 26%. The results can be seen in Table 16.

Table 16. Having enough time to participate in the trainings.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
Had enough time to participate for trainings	39 %	58 %	89 %	26 %	43 %	78 %	58 %	40 %
Did not have enough time to participate I the trainings	16 %	16 %	11 %	26 %	13 %	22 %	25 %	20 %

Of the participants who felt they had enough time to participate to trainings 43% to 100% felt the training was sufficient, and from 0% to 57% felt it was not sufficient. In most sites majority of the participants who had enough time to participate in the trainings felt the training was sufficient. Only in site 6 the percentage was 43%, and among the global employees it was 50%. Among the participants who did not have enough time to participate to the trainings the feeling of sufficiency varied among 0% and 100%. Here the participants who did not have enough time to participate in the trainings also often felt the trainings were not sufficient. Only in site 7 and among the global employees most of those who did not have time to participate also felt the trainings were sufficient. The results can be seen in Table 17.

Table 17. The relation between having time to participate in the trainings and the feeling of training sufficiency.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% of those who had enough time for the training thought it was sufficient	53 %	67 %	76 %	93 %	92 %	43 %	100 %	50 %
% of those who had enough time for the training thought it was not sufficient	47 %	33 %	24 %	7 %	8 %	57 %	0 %	50 %
% of those who did not have enough time for the training thought it was sufficient	0 %	33 %	50 %	29 %	50 %	50 %	67 %	100 %
% of those who did not have enough time for the training thought it was not sufficient	100 %	67 %	50 %	71 %	50 %	50 %	33 %	0 %

The percentage of those who answered that the trainings were taken into account by their supervisor when scheduling their work varied from 18% to 74%. When looking if the participants whose supervisor took the trainings into account when scheduling their work felt also supported by their supervisors, in four sites the percentage of feeling supported is 100%, and in the others over 67%. Among these participants the feeling of not being supported was 0% in four sites, and under 33% in all others.

Table 18. Taking trainings into account when scheduling work.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% felt that the trainings were taken into account by their supervisors when scheduling work	18 %	37 %	74 %	42 %	30 %	56 %	50 %	60 %
Of these % felt their supervisor supported them enough	67 %	71 %	100 %	95 %	100 %	100 %	100 %	67 %
Of these % felt their supervisor did not support them enough	11 %	29 %	0 %	5 %	0 %	0 %	0 %	33 %

Of the participants 10% to 44% reported that the trainings were not taken into account when scheduling work, and of these 25% to 100% felt that their supervisor supported them enough. The amount of participants whose supervisor did not take the trainings into account when scheduling their work and who did not feel supported enough varied between 0% and 75%. The results can be seen in Table 19.

Table 19. Not taking trainings into account when scheduling work.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% felt that the trainings were not taken into account by their supervisors when scheduling work	31 %	21 %	26 %	42 %	40 %	44 %	30 %	10 %
Of these % felt their supervisor supported them enough	27 %	33 %	80 %	68 %	58 %	25 %	75 %	100 %
Of these % felt their supervisor did not support them enough	53 %	67 %	20 %	32 %	42 %	75 %	25 %	0 %

In all sites the group who felt the project was successful was the largest, and the percentage varied between 18% and 83%. The results for the participants who felt the project was successful can be seen in Table 20. Among those who felt that the project was in the end successful majority had positive expectations, and the percentage of having positive expectations among those who in the end felt the project was successful varied between 41% and 100%. Only in site 2 the percentage of those who had positive expectations and felt the project was in the end successful was 41, and in all others over 67%. The percentage for those who had no expectations and felt the project was in the successful varied between 0% and 50%. Here, in site 2, the result was highest, 50%. The percentage of those who had negative expectations but felt in the end the project was successful varied between 0% and 11%.

Table 20. Participants feeling the project was successful and relation to expectations.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% felt the implementation project overall was successful	18 %	39 %	53 %	42 %	53 %	56 %	83 %	40 %
% of those who thought the implementation was in the end successful had positive expectations	67 %	41 %	100 %	68 %	69 %	80 %	70 %	100 %
% of those who thought the implementation was in the end successful had no expectations	22 %	50 %	0 %	23 %	25 %	20 %	20 %	0 %
% of those who thought the implementation was in the end successful had negative expectations	11 %	9 %	0 %	9 %	6 %	0 %	10 %	0 %

The percentage of having mixed opinion of the successfulness of the project varied between 0% and 32%. The results for the participants who had mixed opinion of the successfulness can be seen in Table 21. In site 7 0% had mixed opinions of the successfulness. Among those who had mixed opinion of the successfulness the percentage of having positive expectations varied between 0% and 100%, site 6 having 0% and sites 3 and the global employees having 100%. The percentage of having no expectations also varied between 0% and 100%, sites 3 and global employees having

0% and site 6 having 100%. The percentage of having negative expectations varied between 0% and 29%, sites 3, 5, 6 and global employees having 0%.

Table 21. Participants having mixed opinion of the successfulness and relation to expectations.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% had mixed opinions of successfulness of the project	14 %	32 %	16 %	13 %	10 %	11 %	0 %	20 %
% of those who had mixed opinion about the successfulness had positive expectations	43 %	39 %	100 %	14 %	33 %	0 %	-	100 %
% of those who had mixed opinion about the successfulness had no expectations	43 %	50 %	0 %	57 %	67 %	100 %	-	0 %
% of those who had mixed opinion about the successfulness had negative expectations	14 %	11 %	0 %	29 %	0 %	0 %	-	0 %

The percentage of feeling the project was not successful varied between 0% and 33%. The results for the participants who felt the project was not successful can be seen in Table 22. In sites 4, 5 and 7 0% felt the project was not successful. Among those who felt the project was not successful the percentage of having positive expectations varied between 17% and 100%, sites 3 and global employees having 100%. The percentage of having no expectations varied between 0% and 67%, sites 3 and global employees having 0. The percentage of having negative expectations varied between 0% and 17%, sites 2, 3, 6 and global employees having 0% and site 1 having 17%.

Table 22. Participants feeling the project was not successful and relation to expectations.

	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Global
% felt the implementation project was not successful	12 %	7 %	5 %	0 %	0 %	33 %	0 %	20 %
% of those who thought the implementation was in the end not successful had positive expectations	17 %	75 %	100 %	-	-	33 %	-	100 %
% of those who thought the implementation was in the end not successful had no expectations	67 %	25 %	0 %	-	-	67 %	-	0 %
% of those who thought the implementation was in the end not successful had negative expectations	17 %	0 %	0 %	-	-	0 %	-	0 %

The most common feeling of the project seems to be that it was successful, and the group who felt the project was successful was the largest in all sites. Having mixed feelings of the successfulness was the second most common, and those who felt the

project was not successful were the minority in almost all sites. Only in site 6 the group of those who felt the project was not successful was larger than those who had mixed opinion of the successfulness, and among the global employees the percentage for both mixed feeling and feeling the project was not successful was 20%.

5.4 Results of the survey per site

All users were instructed to participate on all sites if they were working in the company during the implementation project. The percentages are rounded to full digits. Some of the participants left some fields blank, so the overall percentage does not always add up to 100%. The blank answers were left in overall results, because removing them would distort the results and it would give the impression that more or less of the overall group had a certain opinion in a certain question.

5.4.1 Site 1

In total 59 answers were got from Site 1, of which 49 were from participants who worked in the company in the time of implementation. The following statistics are taken from these 49 answers.

Expectations

On Site 1 79% of the participants felt that they understood why the ERP system was implemented, but some commented that the reasons were not highlighted to the workers enough. Of the participants 39% had positive expectations about the upcoming implementation, 12% had negative expectations and 47% had no expectations.

It is interesting to see, that of those who had positive expectations, 32% thought that the implementation was successful in the end, 16% had a mixed opinion about the successfulness, and 5% thought the project was not successful. Of those who had no expectations, 9% thought that the project was successful in the end, 13% had a mixed opinion and 17% thought the project was not successful. Among those who had negative expectations the feeling if the project was successful or not was divided; 17% thought the project was successful in the end, 17% had mixed opinions and 17% thought the project was not successful.

Processes

Of the participants 49% reported that their work processes were changed, and of all participants 61% answered that they understood why the processes were changed. Of those who reported that their work processes were changed, 54% reported that they understood why the changes were made. Of those who reported that their processes were not changed, 63% reported that they understood why the processes were changed. In the survey participants had 3 options to answer the question; Yes, No and I do not remember.

On Site 1 92% of the participants felt that the ERP system fits their work processes. Of those who reported to not have received training, 100% felt that the ERP-system fits their work processes. Among those who did not receive training, 83% felt that the system fits their work processes. Among those whose work processes were changed, whether they received training or not, 100% felt that the system fits their processes.

Some of the participants felt that they needed to figure out things themselves, and that things were even kept from them, and they needed to test different ways to work to make their own work faster. Some of the participants felt that in the beginning the new system felt harder, but with time they learnt how to use the system and now they can use it better.

Support

When considering the feeling of being supported, 39% of the participants felt that the supervisors and management supported them enough during process changes and 29% felt that the supervisors and management did not support them enough. Of those whose work processes were changed 46% felt that they got enough support, and of those whose work processes were not changed 25% felt that they got enough support from the supervisors and management.

Among those whose work processes were changed and who received training 71% felt that they got enough support from their supervisor and management, and of those whose work processes were changed but who did not receive training 0% felt that they got enough support.

In site 1 22% of the participants felt that the management supported the project with enough resources, and 45% of the participants felt that the management did not support the project with enough resources. Of the participants 27% felt that their site got enough attention during the project, and 24% felt that their site did not get enough attention.

In total 51% of the participants on Site 1 felt that they got enough support from their own supervisor during the implementation, and 43% of the participants felt that they did not get enough support from their supervisor during the implementation. Of those whose work processes were changed 46% felt that they got enough support from their own supervisor during the implementation and 46% felt that they did not get enough support.

In open answers participants told that nobody asked how they were doing, they were short on resources and the schedule was too tight, which also effected customer satisfaction. One of the participants told, that some management members came to see the situation couple of times, and in their motivational speech they scolded them for being too slow, and threatened with getting new workers to take their place, even though the slowness was because of poor planning and not because the workers would have been slow. Also couple of comments criticized the fact that they were expected to handle their normal work tasks without problems when the same time they also needed to learn the new system. Many participants also wrote, that they thought the system was not tested enough before the implementation.

Training

On Site 1 51% of the participants reported to have received training and 24% told that they did not receive training. None reported to have declined from training if it was offered. Of those whose work processes were changed 58% received training, and 29% did not receive training. Of those who received training 56% had their work processes changed, and of those who did not receive training 58% had their work processes changed.

Of all participants 39% thought that the training was sufficient. Of those who received training 52% thought the training was sufficient, and of those who did not receive training 0% thought that the training was sufficient. Of those who received training and whose work processes were changed 43% thought that the training was sufficient.

When considering the available time for the trainings, 39% reported to have had enough time for the trainings, and 16% reported that they did not have enough time for the trainings. Of those who reported to have had enough time for the trainings 53% thought it was sufficient, and 47% thought it was not sufficient. All of those who did not have enough time for the trainings thought it was not sufficient.

When asked if the trainings were taken into account by participants' supervisors when scheduling their work 18% reported that the trainings were taken into account and 31% reported that the trainings were not taken into account by their supervisor when scheduling their work. Of those who answered that their supervisor took the trainings into account 67% felt that their supervisor supported them enough during the implementation, and 11% felt that their supervisor did not support them enough during the implementation. Of those who answered that their supervisor did not take the trainings into account when scheduling their work 27% answered that their supervisor supported them enough during the implementation, and 53% answered that their supervisor did not support them enough.

In the open answers participants wished that they got more training based on their own work processes and needs, and also after the implementation was done. Some felt neglected because they had no access for training that they felt that they needed. Many people felt that they learned the system with trial and error. There was a divide in the open answers though, and some participants wrote that they had sufficient training, while others felt that the training provided was insufficient or it was not available.

Successfulness

On Site 1 18% reported that they thought the implementation project overall was successful, 14% had mixed opinions and 12% thought it was not successful.

In total 67% had positive expectations, 22% had no expectations and 11% had negative expectations of those who thought the project was in the end successful. For mixed opinions, 43% had positive expectations, 43% had no expectations and 14% had negative expectations of those who had mixed opinions about the successfulness in the end. Of those who thought the project was not successful 17% had positive expectations, 67% had no expectations and 17% had negative expectations.

Open answers

The results of what users needed could be divided into 5 categories; training, communication, engagement, planning and processes.

Trainings: More training, training outside normal work hours but included in work time

Communication: More named support persons, communication between departments and inside them, listening to workers, communicating changes and giving time to react, communicating the need and perks of the new system

Engagement: Bigger work group and participating, engaging everyone

Planning: Enough time, no rush, access and needed user permissions available immediately, better planning and preparing

Processes: Change the processes to fit the system and not vice versa, harmonizing the processes

5.4.2 Site 2

In total 66 answers were got from Site 2, of which 57 were from participants who worked in the company in the time of implementation. The following statistics are taken from these 57 answers.

Expectations

In site 2 53% of the participants felt that they understood why the ERP system was implemented. In open answers one participant commented, that the reason to implement the new system was to make the lives of employees harder. Of the participants 44% of the participants had positive expectations, 47% had no expectations and 9% had negative expectations about the implementation.

Also in site 2 the most of those who had positive expectations also felt the project was in the end successful, and 32% thought the project was successful, 16% had mixed opinion and 12% thought the project was not successful. Interestingly, even higher percentage of the feeling of success was in the groups which had no expectations or had negative expectations. In the group which had no expectations 41% thought the project was successful, 33% had a mixed opinion and 4% thought it was not successful. In the group which had negative expectations, 40% thought that the project was successful and 40% had mixed opinion. 0% of those who had negative expectations thought that the project was not successful in the end.

Processes

In site 2 75% answered that their work processes were modified during the project. Of all participants 42% understood why the processes were changed. Of those who reported that their work processes were changed, 47% reported that they understood why the changes were made. Of those who reported that their processes were not changed, 50% reported that they understood why the processes were changed. In the survey participants had 3 options to answer the question; Yes, No and I do not remember.

Of the participants 68% felt that the ERP system fits their work processes. Of those who reported to have received training, 71% felt that IFS their work processes. Among those who did not receive training, 71% thought that the ERP system fits their work processes. Of those whose work processes were changed and who received training, 69% felt that IFS fits their work processes, while those whose work processes were changed and who did not receive training 50% felt that the system fits their work processes.

Many of the free-word answers felt that there was a lot of good in the new system and it made their work easier in the end, but that it was implemented ignoring the feedback. Some participants still felt that the system made life hard in the production, and it slows down work. Given the open answers users wished for more time, better planning and

that someone would have known the system throughout and they would not have needed to figure the system out by themselves.

Support

In total 54% of the participants in site 2 felt that the supervisors and management supported them enough during process changes, and 23% felt that supervisors and management did not support them enough during the process changes. Among those participants whose work processes were changed 63% felt that they got enough support from the supervisors and management, and of those whose own work processes were not changed 33% felt that they got enough support.

Among those whose work processes were changed and they received training 69% felt that they got enough support from their own supervisors and management during the process changes, and among those whose work processes were changed and who did not receive training 0% felt that they got enough support.

On site 2 28% felt that the management supported the project with enough resources, and 35% of the participants felt that the management did not support the project with enough resources. Of the participants 30% felt that their own site got enough attention in the project, and 35% felt that their own site did not get enough attention in the project.

When considering the feeling of being supported, 53% of the participants felt that they got enough support from their supervisor during the implementation, and 42% of the participants felt that they did not get enough support from their supervisor during the implementation. Of those who reported that their work processes were changed during the implementation 56% felt that they got enough support from their supervisor, and 42% felt that they did not get enough support.

When asked about provided support in the open answers, many participants said that the training was insufficient.

Training

When asked about training, 74% of the participants reported to have received training, 12% did not receive training and 4% reported to have declined from the training. Of the participants whose work processes were changed 84% received training, 9% did not receive training and 2% declined the training. Of those who received training 86% had their work processes changed, and of those who did not receive training 57% had their work processes changed.

Of all participants 54% thought that the training was sufficient. Of those who received training 67% thought that the training was sufficient, while those who did not receive training 0% thought it was sufficient. Of those whose work processes were changed and who received training 64% thought it was sufficient.

When considering the available time to participate in the trainings, 58% of the participants felt that they had enough time to participate in the trainings, and 16% felt that they did not have enough time for the trainings. Of those who felt they had enough time to participate 67% thought that the training was sufficient, and 33% thought it was not sufficient. Of those who did not have enough time to participate, 33% thought it was sufficient and 67% thought it was not sufficient.

When asked if the trainings were taken into account by their supervisors when scheduling their work 37% reported that the trainings were taken into account and 21% reported that they were not taken into account. Of those who reported that the trainings were taken into account by their supervisors when scheduling their work 71% thought that their supervisor supported them enough during the process changes and 11% felt that their supervisor did not support them enough during the process changes. Of those who reported that the trainings were not taken into account 33% felt that their supervisor supported them enough during the implementation and 67% felt that the supervisor did not support them enough.

In the open answers more training and more in-depth training was wished, and that the training material was more clear and that the trainers were more competent. One participant commented that they were surprised that they needed to figure things out on the ground-level, while they thought everything was already worked out. Training and training material on site's own language was wished.

Successfulness

In Site 2 39% reported that they thought the implementation project overall was successful, 32% had mixed opinions and 7% thought it was not successful. Of those who felt that the implementation was overall successful 41% had positive expectations about the implementation project, 50% had no expectations and 9% had negative expectations. Of those who had mixed opinion about the successfulness, 39% had positive expectations, 50% had no expectations and 11% had negative expectations. Of those who thought the implementation project was not successful in the end 75% had positive expectations, 25% had no expectations and 0% had negative expectations.

Open answers

The results of what users needed could be divided into 4 categories; training, communication, planning and processes.

Training: Deeper training, overall picture from the system, training and documentation on site language, proper training material, practical training

Communication: Communicating the purpose and need of process changes and system implementation to the end users

Planning: Enough time, no rushing

Processes: Processes need to fit the system, proper training of new processes

5.4.3 Site 3

In total 21 answers were got from Site 3, of which 19 were from participants who worked in the company in the time of implementation. The following statistics are taken from these 19 answers.

Expectations

In site 3 89% felt that they understood why the ERP system was implemented. All of the participants had positive expectations, and 53% of these felt that the project was

successful in the end, 16% had a mixed opinion and 5% felt that the project was not successful.

Processes

In total 95% of the participants in site 3 reported that their work processes were changed, 5% saying that they do not remember if the processes were changed, meaning that none of the participants reported that their own work processes were not changed. This affects also the results later, since the parts where the data from those whose work processes were not changed does not exist. In the survey participants had 3 options to answer the question; Yes, No and I do not remember.

Of all participants 84% felt that they understood why the processes were changed. Of those who reported that their work processes were changed 83% felt that they understood why the changes were made. No one answered that their work processes were not changed, so the data does not exist for that group.

When asked if the ERP system fits the work processes, 84% of the participants felt that the ERP system fits. Of those who reported to have received training, 94% felt that IFS fits their work processes. Of those who did not receive training, 33% felt that the system fits their work processes. 93% of those whose work processes were changed and who received training felt that the system fits their work processes, and 33% of those whose processes were changed and who did not receive training felt that it fits their work processes.

The positivity towards the system and process changes was visible in the open answers overall. One participant commented that a lot of work is still done by hand, and they compare the system data being skeptical if the system data credibility is high enough.

Support

In site 3 95% of the participants felt that the supervisors and management supported them enough during process changes, and 5% felt that the supervisors and management did not support them enough.

Of those whose work processes were changed 94% felt that they got enough support. No one reported that their work processes were not modified. Of those whose work processes were changed and who received training 100% felt that they got enough support, and among those whose work processes were changed but who did not receive training 67% felt that they got enough support.

In total 74% of the participants in site 3 felt that the management supported the project with enough resources, and 21% of the participants felt that the management did not support the project with enough resources. Of the participants 68% felt that their own site got enough attention in the project, and 16% felt that their own site did not get enough attention in the project.

Of the participants 89% felt that they got enough support from their supervisor during the implementation, and 11% of the participants felt that they did not get enough support from their supervisor during the implementation. Of those who reported that their work processes were changed during the implementation 89% felt that they got enough support from their supervisor, and 11% felt that they did not get enough support.

In the open answer participants focused on the training, and wished that the whole factory had been taken more into account and not just the management and officers.

Training

Of the participants 84% reported to have received training, 16% saying they did not get training. None of the participants reported to have declined from the training if it was offered. Of those who reported that their work processes were changed 83% received training, and 17% did not receive training. Of those who received training 94% reported that their work processes were changed, and of those who did not receive training 100% reported that their work processes were changed.

Of all participants 74% thought that the training was sufficient. Of those who received training 81% felt that it was sufficient, and of those who did not receive training 33% felt that it was sufficient. Of those whose work processes were changed and who received training for the new processes, 80% thought the training was sufficient.

In total 89% of the participants in site 3 felt that they had enough time to participate for the trainings and 11% felt that they did not have enough time to participate in the trainings. Of those who had enough time to participate in the training 76% felt that it was sufficient and 24% felt that it was not sufficient. Of those who did not have enough time to participate 50% felt that it was sufficient and 50% felt that it was not sufficient.

Of the participants 74% reported that the trainings were taken into account by their supervisors when scheduling their work, 26% saying that the trainings were not taken into account. Of those who reported that the trainings were taken into account by their supervisors when scheduling their work 100% thought that their own supervisor supported them enough during the implementation. Of those who reported that the trainings were not taken into account when scheduling their work, 80% thought that their own supervisor supported them enough during the implementation changes and 20% thought that their supervisors did not support them enough.

In open answers the participants wished more overall picture in the training, and insight how they could solve problems by themselves.

Successfulness

In total 53% of the participants in site 3 reported that they felt the implementation project overall was successful, 16% had mixed opinion and 5% felt that it was not successful. Of those who felt the project was successful 100% had positive expectations. Of those who had mixed opinion 100% had positive expectation. Of those who felt the project was not successful 100% had positive expectations.

Open answers

On this site the answers were divided in 4 categories; trainings, teams, engaging and processes.

Trainings: Adequate amount of training, training the whole process, deeper understanding of the system

Teams: Meaning of teamwork

Engaging: Engaging workers, leaders and managers

Processes: Reducing the work which is done manually, make full use of IFS

5.4.4 Site 4

In total 53 answers were got from Site 4, and all of them were from participants who worked in the company in the time of implementation.

Expectations

In site 4 58% of the participants felt that they understood why the ERP system was implemented. Of the participants 49% had positive expectations about the upcoming implementation, 32% had no expectations and 19% had negative expectations.

Majority of those who had positive expectations about the upcoming project also felt the project was successful in the end. Among those who had positive expectations 58% felt that the project was overall successful, 4% had a mixed feeling and 0% felt that it was not successful. In the group who had no expectations 29% felt that the project was overall successful in the end, 24% had a mixed opinion and 0% felt that it was not successful. Interestingly, among the participants who had negative expectations 20% felt that the project was in the end successful, 20% had a mixed feeling and 0% felt that the project was not successful.

Processes

Of the participants 49% reported that their work processes were changed. When asked if the participants understood why the processes were changed, 38% reported that they understood why the changes were made. Of those who reported that their work processes were changed, 42% reported that they understood why the changes were made. Of those who reported that their processes were not changed, 29% reported that they understood why the processes were changed. In the survey participants had 3 options to answer the question; Yes, No and I do not remember.

When asked if the ERP system fits the work processes, 62% of the participants felt that the ERP system fits their work processes. Of those who reported to have received training, 91% felt that IFS fits their work processes. Of those who did not receive training 56% felt that the system fits their work processes. Of those whose work processes were changed and who received training 100% felt that the system fits their work processes, and of those whose processes were changed but who did not receive training 57% felt that the system fits their work processes.

Support

In total 68% of the participants in site 4 felt that the supervisors and management supported them enough during process changes, and 8% felt that the supervisors and management did not support enough. Of those whose work processes were changed 65% felt that they got enough support, and 62% of the participants whose work processes were not changed felt that they did get enough support. Of those whose work processes were changed and who received training 60% felt that the system fits their work processes, and of those whose work processes were changed but did not receive training 64% felt that the system fits their work processes.

Of the participants 42% felt that the management supported the project with enough resources, and 19% of the participants felt that the management did not support the

project with enough resources. In total 45% of the participants felt that their own site got enough attention in the project, and 19% felt that their own site did not get enough attention in the project.

Of the participants 79% felt that they got enough support from their supervisor during the implementation, and 21% of the participants felt that they did not get enough support from their supervisor during the implementation. Of those who reported that their work processes were changed during the implementation 85% felt that they got enough support from their supervisor, and 15% felt that they did not get enough support.

In free-word answers participants felt positive that they got training on over hours, and some of them were relieved from other tasks so they could focus on learning the new system. Some felt that the planning was chaotic, and there was no clear information and the responsible persons did not react quickly enough.

Training

Of the participants 21% reported to have received training for the new processes, and 51% reported to not to have received training. None of the participants reported to have declined from the training if it was offered. Of the participants whose work processes were changed 19% received training, and 54% did not receive received training. Of those who received training 45% had their work processes changed, and of those who did not receive training 52% had their work processes changed.

Of all participants 53% thought that the training was sufficient. Of those who received training 82% felt that it was sufficient, and of those who did not receive training 33% felt that it was sufficient. Of those whose work processes were changed and who received training for the new processes 60% thought the training was sufficient.

In total 26% of the participants in site 4 felt that they had enough time to participate in the trainings, and 26% felt that they did not have enough time to participate in the trainings. Of those who had enough time to participate to the training 93% felt that the training was sufficient, and 7% felt that it was not sufficient. Of those who did not have enough time to participate in the trainings 29% felt that it was sufficient, and 71% felt that it was not sufficient.

Of the participants 42% reported that the trainings were taken into account by their supervisors when scheduling their work and 42% reported that the trainings were not taken into account. Of those who reported that the trainings were taken into account by their supervisors when scheduling their work 95% thought that their supervisor supported them enough during the implementation and 5% answered that they were not supported enough. Of the participants 42% reported that the trainings were not taken into account when scheduling their work, of which 68% thought that their supervisor supported them enough during the implementation and 32% thought that their supervisor did not support them enough.

Participants wished for more training and training in bigger groups, so all possible problems could be addressed. Also more information of what has been changes and more examples of how to use the system to improve their work were wished. One participant told that they only had training of the new interface, but not the processes of how to work in the system itself.

In the open answers participants wrote that the trainings were not sufficient enough, but the system change made their work in the end easier. Over hours were received positively, but more time for training was wished, and also presence of people who have the best insight of the system. Information of what will change after the implementation was also missed.

Successfulness

In total 42% of the participants in site 4 reported that they thought the implementation project overall was successful and 13% had mixed opinions. None of the participants felt that the implementation project was not successful. Of those who felt that the implementation project was successful 68% had positive expectations, 23% had no expectations and 9% had negative expectations. Of those who had a mixed opinion about the successfulness 14% had positive expectations, 57% had no expectations and 29% had negative expectations.

Open answers

The answers were divided in 6 categories; training, communication, engagement, planning and teamwork

Training: Reserving time for each employee to get to know the new system or allowing employees to study the system on over time

Communication: Enough information, notifying about changes, telling employees what will be different, communicating the need of the system to the users

Engagement: Highlighting the positive effects, engagement of the leaders and workers, reserving time for the project in employee's schedule

Panning: Reserving enough time, access to the system set correctly, enough resources and data preparation

Teamwork: Studying the new system in teams where questions can be asked and solutions found together

5.4.5 Site 5

In total 33 answers were got from Site 5, and 30 of them were from participants who worked in the company in the time of implementation. The following statistics are taken from these 30 answers.

Expectations

In site 5 73% of the participants felt that they understood why the ERP system was implemented. Of the participants 47% had positive expectations, 47% had no expectations and 7% had negative expectations.

Among those who had positive expectations majority, 79%, felt that the implementation project was successful in the end, while 7% had a mixed opinion and 0% felt that the project was not successful. In the group who had no expectations 29% felt that the project was successful in the end, 14% had a mixed opinion and 0% felt that it was not successful. Of those who had negative expectations 50% felt that the project was

successful in the end, and 0% answered that they had a mixed opinion or that they felt it was not successful.

Processes

Of the participants 37% had their work processes changed and 40% understood why the processes were changed. Among those who reported that their work processes were changed, 45% reported that they understood why the changes were made. Of those who reported that their processes were not changed, 50% reported that they understood why the processes were changed. In the survey participants had 3 options to answer the question; Yes, No and I do not remember.

When asked if the ERP system fits the work processes, 77% of the participants felt that the ERP system fits their work processes. Of those who reported to have received training, 78% felt that the ERP-system fits their work processes, and of those who did not receive training 83% felt that the ERP-system fits their work processes. Of those whose work processes were changed and who received training 67% felt that the system fits their work processes, and 50% of those whose work processes were changed and who did not receive training felt that the system fits their work processes.

In the open answers there were comments saying some of the processes were improved but some got worse. Some processes were also not explained, and with one process that was changed they ended up going back to the old one.

Support

In site 5 37% of the participants felt that the supervisors and management supported them enough during process changes, 10% reported that the supervisor and management did not support them enough during process changes. Of the participants whose work processes were changed 64% felt that they got enough support from the supervisors and management during process changes, and of those whose work processes were not changed 21% felt that they got enough support. Of those participants whose work processes were changed and who received training all felt that their supervisors and management supported them enough, and of the participants whose work processes were changed but who did not receive training none felt that they got enough support.

Of the participants 40% felt that the management supported the project with enough resources, and 23% felt that the management did not support the project with enough resources. In total 63% of the participants felt that their own site got enough attention in the project, and 13% felt that their own site did not get enough attention in the project.

In total 70% of the participants in site 5 felt that they got enough support from their supervisor during the implementation, and 30% of the participants felt that they did not get enough support from their supervisor during the implementation. Of those who reported that their work processes were changed during the implementation 73% felt that they got enough support from their supervisor, and 27% felt that they did not get enough support.

Participants wrote that preparing the needed resources was not sufficient, and that management should understand that changes take time and that those people are needed who have sufficient knowledge about the system and its challenges.

Training

In total 30% of the participants in site 5 reported to have received training for the new processes, and 20% reported to not to have received training. None of the participants reported to have declined from the training if it was offered. Of the participants whose work processes were changed 55% reported to have received training and 18% reported to not have received training. Of those who received training 67% had their work processes changed, and 33% of those who did not receive training had their work processes changed.

Of all participants 63% thought that the training was sufficient. All of those who received training for the new processes thought the training was also sufficient. Of those who did not receive training 17% thought that it was sufficient. All of those whose work processes were changed and who received training felt that the training was sufficient.

When considering the available time for the trainings, 43% felt that they had enough time to participate in the trainings and 13% felt that they did not have enough time. Of those who felt they had enough time to participate in the training 92% felt that the training was sufficient and 8% felt it was not sufficient. Half of those who thought that they did not have enough time for training felt that the training was sufficient and half felt that it was not sufficient.

Of the participants 30% reported that the trainings were taken into account by their supervisors when scheduling their work and 40% said that the trainings were not taken into account. All of those who reported that the trainings were taken into account by their supervisors when scheduling their work also felt that their supervisor supported them enough during the implementation. Of those who reported that the trainings were not taken into account when scheduling their work 58% thought that their supervisor supported them enough during the implementation and 42% thought that their supervisor did not support them enough.

More training, information about the trainings, more involvement and invitations to correct people to the trainings were wished.

Successfulness

In total 53% of the participants in site 5 reported that they felt the implementation project overall was successful and 10% had mixed opinions. None of the participants felt that the implementation project was not successful. Of those who felt the implementation was successful 69% had positive expectations, 25% had no expectations and 6% had negative expectations. Of those who had mixed opinions of successfulness of the project 33% had positive expectations, 67% had no expectations and 0% had negative expectations.

Open answers

The answers were divided in 4 categories; training, communication, planning and participating.

Training: Informing users about the trainings in time, practical training, instructions from the start and continuous training

Communication: More information about upcoming changes in the system

Planning: Time and resource planning, on-site support, no rushing, proper testing and general project plan which is being updated

Participating: Possibility to be involved and affect, involving and participating users and asking their opinion

5.4.6 Site 6

In total 18 answers were got from Site 6, and 9 of them were from participants who worked in the company in the time of implementation. The following statistics are taken from these 9 answers.

Expectations

In site 6 100% of the participants felt that they understood why the ERP system was implemented. Of the participants 56% had positive expectation and 44% of the participants had neutral expectations. 0% reported to have had negative expectations.

In the group who had positive expectations the majority, 80%, felt the implementation project was successful in the end, while 0% had mixed opinion and 20% felt it was not successful. Of those who had no expectations 25% felt it was successful in the end, 25% had a mixed opinion and 50% felt it was not successful. None of the participants had negative expectations.

Processes

When asked if the work processes were changed 78% reported that changes were made in their work processes, and 67% felt they understood why the processes were changed. Of those who reported that their work processes were changed, 57% reported that they understood why the changes were made. Of those who reported that their processes were not changed, 100% reported that they understood why the processes were changed. In the survey participants had 3 options to answer the question; Yes, No and I do not remember.

Of the participants 56% felt that the ERP system fits their work processes. Of those who reported to have received training 33% felt that the ERP fits their work processes, and of those who did not receive training 50% felt it fits their work processes. Among those whose processes were changed and who received training 67% felt that the system fits their work processes, and 50% of those whose work processes were changed but who did not receive training felt that the system fits their work processes.

In the open answers a participant wrote that some departments were still using the old ERP system.

Support

In site 6 11% of the participants felt that the supervisors and management supported them enough during process changes and 44% reported that the supervisor and management did not support them enough during process changes. Of those whose work processes were changed 14% felt that they got enough support, and of those whose work processes were not changed none felt they got enough support. Of those whose work processes were changed and who also received training 33% felt the supervisors and management supported them enough, and of the participants whose

work processes were changed but they did not receive training none felt they got enough support from their supervisors and management.

Of the participants 33% felt that the management supported the project with enough resources, and 56% felt that the management did not support the project with enough resources. In total 89% felt that their own site got enough attention in the project, and 11% felt that their own site did not get enough attention in the project.

In total 67% of the participants felt that they got enough support from their own supervisor during the implementation, and 33% of the participants felt that they did not get enough support from their supervisor during the implementation. Of those who reported that their work processes were changed during the implementation 57% felt that they got enough support from their supervisor, and 43% felt they did not get enough support.

Participants commented that they were assumed to handle the system, and their questions were not addressed properly. One comment was that they felt that the system was forcibly introduced.

Training

When asked about training, 33% of the participants reported to have received training for the new processes and 44% reported to not to have received training. None of the participants reported to have declined from the training if it was offered. Of the participants whose work processes were changed 43% received training and 57% did not receive training. All of those who received training had their work processes changed, and also all of those who did not receive training had their work processes changed.

Of all participants 44% thought that the training was sufficient. Of those who received training 67% felt that it was sufficient, and none of those who did not receive training felt it was sufficient. Of those whose work processes were changed and who also received training 67% felt it was sufficient.

When considering the available time for the trainings, 78% felt they had enough time to participate in the training and 22% felt they did not have enough time to participate. Of those who felt they had enough time to participate in the training 43% thought that the training was sufficient and 57% thought that the training was not sufficient. Half of those who felt that they did not have enough time for training also felt that the training was sufficient and half felt that it was not sufficient.

In total 56% of the participants in site 6 reported that the trainings were taken into account by their supervisors when scheduling their work and 44% reported that the trainings were not taken into account. All of those who reported that the trainings were taken into account by their supervisors when scheduling their work thought that their supervisor supported them enough during the implementation. Of the participants 44% reported that the trainings were not taken into account when scheduling their work, of which 25% thought that their supervisor supported them enough during the implementation and 75% thought that their supervisor did not support them enough.

In the open answers the training was criticized to be superficial, some received internal and external trainings but some did not get training at all or help was provided by colleagues, but no official training was offered. Participants commented that they

wished the training was on their own language, and that they also wanted to know why they were supposed to do certain actions in the system, such as ticking a box, since it would give a meaning to the action and therefore be remembered better.

Successfulness

In total 56% of the participants reported that they thought the implementation project overall was successful, 11% had a mixed opinion and 33% thought it was not successful. Of those who felt the project was successful 80% had positive expectations and 20% had no expectations, 0% had negative expectations. Of those who had a mixed opinion 0% had positive thoughts, 100% had no expectations and 0% had negative expectations. Of those who felt the project was not successful 33% had positive expectations, 67% had no expectations and 0% had negative expectations.

Open answers

The answers were divided in 5 categories; training, communication, planning, processes and engagement:

Training: Deeper training, overall picture of the system, practical training, documentation, enough time for the trainings, training also after the implementation and training in site language.

Communication: Communicating the need for the system to the users, highlighting good points of the system, encouraging and positive attitude

Planning: Planning the trainings, enough time, no rushing

Processes: Processes should fit the system, checking complex proceses if they can be simplified

Engagement: Enough support from the management, supervisors and global team, engaging users, supervisors and management

5.4.7 Site 7

In total 14 answers were got from Site 7, and 12 of them were from participants who worked in the company in the time of implementation. The following statistics are taken from these 12 answers.

Expectations

In site 7 75% of the participants felt that they understood why the ERP system was implemented. Of the participants 67% had positive expectations, 25% had neutral expectations and 8% had negative expectations.

Among those who had positive expectations majority, 89%, felt the project was successful in the end, while 0% had a mixed opinion or felt it was not successful. Of those who had no expectations 67% felt the project was successful in the end and 0% had mixed opinions or felt the project was not successful. Interestingly, of those who had negative expectations 100% felt the project was successful in the end, and 0% had mixed opinions or felt the project was not successful in the end.

Processes

Of all participants 58% had their work processes changed and 58% felt that they understood why the processes were changed. Of those who reported that their work processes were changed, 86% reported that they understood why the changes were made. Of those who reported that their processes were not changed, 33 % reported that they understood why the processes were changed. In the survey participants had 3 options to answer the question; Yes, No and I do not remember.

In site 7 100% of the participants felt that the ERP system fits their work processes, regardless if the participant received training or not or if the processes were changed.

Support

In site 7 83% of the participants felt that the supervisors and management supported them enough during process changes and 8% reported that the supervisor and management did not support them enough during process. Of those whose work processes were changed 86% felt that they got enough support, and of those whose work processes were not changed 67% felt they got enough support. All of those whose work processes were changed, and who received training, felt that the supervisors and management supported them enough, and none of the participants whose work processes were changed but who did not receive training felt that they got enough support.

Of the participants 92% felt that the management supported the project with enough resources, and 0% felt that the management did not support the project with enough resources. In total 75% felt that their own site got enough attention in the project, and 0% felt their site did not get enough attention.

In total 92% of the participants in site 7 felt that they got enough support from their supervisor during the implementation, and 8% of the participants felt that they did not get enough support from their supervisor during the implementation. Of those who reported that their work processes were changed during the implementation 86% felt that they got enough support from their supervisor and 14% felt they did not get enough support.

Management was reported to give answers fast to the questions asked, and they were always available. The management was also reported to be supportive, encouraging and positive, and they helped the participants to make time for the trainings and communicated the importance of the implementation, and also told how it would improve their situation. One participant reported that they were not able to break away from assigned tasks to try out the new system.

Training

When asked about training, 67% of the participants reported to have received training and 8% reported to not to have received training. None of the participants reported to have declined from the training if it was offered. Of those whose work processes were changed 86% received training and 14% did not receive training. Of those who received training 75% had their work processes changed, and all of those who did not receive training had their work processes changed.

Of all participants 92% thought that the training was sufficient. All of those who received training felt it was also sufficient, and of those who did not receive training

none felt it was sufficient. All of those whose work processes were changed and who also received training for the new processes thought the training was sufficient.

When considering the time available for the trainings, 58% felt they had enough time to participate in the training and 25% felt they did not have enough time. All of those who thought they had enough time to participate in the training thought that the training was sufficient. Of those who thought that they did not have enough time to participate in the training 67% thought that the training was sufficient, and 33% thought it was not sufficient.

Half of the participants reported that the trainings were taken into account by their supervisors when scheduling their work and 30% said that the trainings were not taken into account. All of those who reported that the trainings were taken into account by their supervisors when scheduling their work thought that their own supervisor supported them enough during the implementation. Of the participants 30% reported that the trainings were not taken into account when scheduling their work, of which 75% thought that their supervisor supported them enough and 25% thought that their supervisor did not support them enough.

In the open answers in-depth training was wished, and also the opportunity to learn from other sites how they are doing things in the system.

Successfulness

In total 83% of the participants on site 7 reported that they thought the implementation project overall was successful in the end, and none reported that they had mixed opinions or felt the project was not successful. Of those who felt the project was successful 70% had positive expectations, 20% had no expectations and 10% had negative expectations.

Open answers

The answers were divided in 4 categories on this site; training, communication, planning and processes

Training: Deeper training, overall picture of the system, practical training, documentation, enough time for the trainings and time to get to know the system, training after the implementation

Communication: Communicating the need for the new system to the users, highlighting the good points of the system, encouraging and positive attitude

Planning: Planning the trainings, enough time, no rushing

Processes: Process mapping (also site-specific) available for users and instructions

5.4.8 Globals

In total 10 answers were got from the global workers, all of them were from participants who worked in the company in the time of implementation. 3 of the answers had exact same open answers as another participant's answer, but since the answers were identified only with participant number given based on the order number of the participant, we cannot know if it is from the same employee. These answers were

decided to keep in the data set, since it might be that two participants did the survey together, and therefore had the same answers. There is no sign of duplicate answers in any other answers, and there is no reason to suspect an error with the data retrieval from the survey system.

Expectations

Among the global employees 90% of the participants felt that they understood why the ERP system was implemented. Of the participants 90% had positive expectations and 10% had no expectations. 0% had negative expectations.

Of those who had positive expectations 44% felt the project was successful in the end, 22% had a mixed opinion and 22% felt it was not successful. The participant(s) who had no expectations did not answer to the question about the feeling of overall successfulness of the project. None of the participants had negative expectations.

One participant who had positive expectations wrote that he/she was concerned that the team will not have enough time for the implementation, production will stop and there will be errors in data migration. Easier and up-to-date user interface was mentioned in many comments as an expectation. Participants commented that the project was exceptionally stressful, and that it was a huge project which was handled with small resources.

Processes

Of the participants 80% had their work processes modified and 80% understood why the processes were changed. Among those who reported that their work processes were changed, 100% felt that they understood why the changes were made. Of those who reported that their processes were not changed, 0% felt that they understood why the changes were made. In the survey participants had 3 options to answer the question; Yes, No and I do not remember.

Among the global employees 80% of the participants felt that the ERP system fits their work processes. 75% of those who received training felt the system fits their work processes, and 100% of those who did not receive training felt it fits their work processes. Of those whose work processes were changed and who received training 75% felt the system fits their work processes. None of the participants had the situation that their work processes would have been changed but they would not have received training, so the data does not exist for that group.

It was mentioned in the open answers, that the system should not be changed to fit the processes, but the processes should be changed to fit the system. On one factory the employees were allowed to demand changes to the system based on their own work processes, which were not working well in the overall process chain of the system, but they were more of relics of the old ways of doing things.

Support

Among the global employees 50% of the participants felt that the supervisors and management supported them enough during process changes and 30% reported that the supervisor and management did not support them enough during process changes. Of those whose work processes were changed 50% felt that they got enough support, and of those whose work processes were not changed 0% felt they got enough support. Among those whose work processes were changed and who received training 50% felt

they got enough support. None of the participants had the situation that their work processes would have been changed but they would have not received training.

In total 20% of the participants among the global employees felt that the management supported the project with enough resources and 40% felt that the management did not support enough. Of the participants 60% felt that their own site got enough attention in the project and 20% answered that it did not get enough attention.

Of the participants 80% felt that they got enough support from their supervisor during the implementation and 20% of the participants felt that they did not get enough support from their supervisor during the implementation. Among those who reported that their work processes were changed during the implementation 75% felt that they got enough support from their supervisor and 25% felt they did not get enough support.

Training

In total 80% of the participants among the global employees reported to have received training for the new processes, and 20% reported to not to have received training. None of the participants reported to have declined from the training if it was offered. All of the participants whose work processes were changed did receive training, and all of those who received training had their work processes changed. None of those who did not receive training had their work processes changed.

Half of the participants thought that the training was sufficient. Half of those who received training felt it was sufficient, and half of those who did not receive training felt it was sufficient. Half of those whose work processes were changed and who received training thought the training was sufficient.

Of the participants 40% reported that they had enough time to participate in the training, 20% said that they did not have enough time to participate in the trainings and 40% said that training was not offered. Half of those who felt they had enough time to participate in the training felt that the training was sufficient, and half felt it was not sufficient. All of those who thought that they did not have enough time for training felt that the training was sufficient.

In total 60% reported that the trainings were taken into account by their supervisors when scheduling their work and 10% said that the trainings were not taken into account. Of those who reported that the trainings were taken into account by their supervisors when scheduling their work 67% felt that their supervisor supported them enough during the implementation and 33% felt that their supervisor did not support them enough. Of the participants 10% reported that the trainings were not taken into account when scheduling their work, of which all thought that their supervisor supported them enough during the implementation.

In the open answers many of the participants wished for more training, and more different use cases to be gone through in trainings. Users also thought that they did not have enough information of the deeper functionality of the system in the time of the implementation, and wished they had known the database structure and SQL more.

Successfulness

In total 40% among the global employees reported that they thought the implementation project overall was successful, 20% had a mixed opinion and 20% thought it was not successful. All of those who felt the project was overall positive had positive

expectations before the project. All of those who had a mixed opinion of the project had positive expectations before the project. All of those who felt the project was not successful had positive expectations. The participant(s) who had no expectations did not answer to the question about the feeling of overall successfulness of the project. None of the participants had negative expectations.

Open answers

The answers were divided in 3 categories on this site; training, planning and processes

Training: More training, deeper understanding of the system

Planning: Harmonizing processes in time, realistic time schedule, enough resources, testing

Processes: Should not make the system fit the processes, but change the processes

5.5 Discussing the model with ERP implementation project group

On 22.9.2020 the project management and the project group had a meeting, where the proposed model was introduced. Opinions of the participants were asked considering the model. 20 people were present in the meeting, including the global project manager, local project leader, and project leaders from different areas such as manufacturing and finance.

The model was explained to the group participating in the meeting. In the beginning the constructs of the model were not clear to the participants, and they were explained with examples. The opinions which arose from the model were more focused on concrete action points what could be done to affect the constructs and the successfulness of the project.

The comments that arose from the model and discussion followed by it are listed in the Table 9. The comments are numbered by order and then linked to the factors that are related to them.

PE=Performance Expectancy

EE=Effort Expectancy

SI=Social Influence

FC=Facilitating Conditions

A=Attitude

Table 9. Comments of the model from the project meeting.

#	Comment	PE	EE	SI	FC	A
1	Sharing success stories on the site implementing from other sites			x		
2	Understanding the processes is important, and the whole process flow. Shortcuts at one phase might harden some other part of the same process.	x			x	
3	Communicating that the implemented system supports the user, and does not replace the user. The released resources such as time can be reallocated, and the user does not need to be afraid that they will be fired.	x				x
4	Bringing people together to share knowledge, meetings within departments from different sites		x		x	
5	Reacting to the problems of users so they feel that they are heard and taken seriously, their problems should not be belittled				x	x
6	Explaining to users why things are done the way they are				x	x
7	Taking into account the load of pressure, and that everyone cannot handle the same amount of pressure (considering support from top management)				x	
8	Training				x	
9	Named resources for the moment when things do not go as expected (extra resources and back-ups)				x	
10	Management commitment				x	x

All of the comments which arose from the model could be clearly traced to the factors included in the model, which would imply that the factors are valid. No comments arose which could not be traced to the factors. Based on the discussion the proposed model seems to be comprehensive.

6. Findings

In this chapter the findings of the thesis are introduced. First in chapter 6.1 the findings considering the proposed model are discussed, and then in chapter 6.2 the findings considering the survey are discussed.

6.1 Findings considering the proposed model

The model was constructed based on prior research. The foundation was UTAUT-model by Venkatesh et al. (2003), and more recent research of the field was used to develop a new model for ERP implementation environment. The survey results seem to support including the factor Attitude to the model, since positive expectations before the project seem to have a relation to positive feeling of the outcome after the project.

The model was evaluated in the discussion with the project team of the company and in the light of the survey results. The comments that arose from the discussion could be traced directly to the factors of the model, which would imply that they are valid. No comments arose which would not have fitted to the factors of the model, which suggested that the model was comprehensive. In the discussion concrete action points arose considering what organizations should do to ensure a successful project. Therefore the model could be improved by adding more concrete actions for the organizations to follow and take into account.

UTAUT (Venkatesh et al., 2003) did not include the attitude-factor, but the results of this survey suggested that there is a relation between positive expectations and a positive feeling of the outcome of the project. This supported including the attitude-factor in the model.

6.2 Findings considering the survey

Site 6 was the only site where all the participants felt they understood why the system was implemented. Site 2 had the lowest result, 53%. Site 2 also had more of those participants who had no expectations than those who had positive expectations. When looking at the results from all the sites, most of the participants had positive expectations, but in some sites no expectations were more common than positive expectations. Negative expectations were the minority on all sites. Most of those who had positive expectations also felt the implementation was successful on all sites.

The participants who had positive expectations were most likely to feel the project was in the end successful too. This would imply that the positive expectations in the beginning of the project help to ensure the feeling of successfulness after the project. The relation between the expectations and feeling of outcome was not clear among those who did not have expectations and who had negative expectations, and there the overall feeling was more divided. When comparing the percentages of different expectations and feelings of outcomes, it is important to notice that the positive expectation was also most common.

The results considering the expectations and feeling of outcome suggest that organizations should pay attention to strengthen the positive attitudes and create positive atmosphere considering the upcoming implementation project to ensure the feeling of a successful project in the end.

In none of the sites all employees felt that they understood why the changes to work processes were made. On site 6 an interesting phenomenon can be seen; 57% of those whose processes were changed understood why the changes were made, and 100% of those whose processes were not changed understood why the changes were made. The result here seems to depend a lot on the site, and on some sites more of those whose processes were changed felt they understood why the changes were made, on some sites it was the other way around and on some sites the result was closer to 50/50.

In almost all sites those who received training were more likely to feel that the system fits their work processes, especially when those work processes are changed. This would suggest that there is a relation between receiving training and the feeling that the system fits the work processes, especially when the user's work processes are changed. This should be taken into account when considering offering the trainings, and the trainings should be offered to all those whose work processes are being changed. It needs to be noted though, that the system had been in use for a couple of years in some of the sites in the time of the survey, and in other sites it had been implemented more recently. The feeling of system fit might have changed during the time the participants have been using it and learning more of it.

On all sites those whose work processes were changed felt more supported than those whose work processes were not changed. When comparing those whose work processes were changed and who received training with those whose work processes were changed but who did not receive training, in many sites the feeling of being supported enough was at 100% among those who got training, and in most sites it was 0% among those who did not get training. Also, on some sites the difference in feeling supported by participant's own supervisor seemed to be on a different level between those whose work processes were changed, and whose work processes were not. This would suggest that receiving training is very important for the feeling of support, especially when work processes are changed. In the other hand, those should not be forgotten whose work processes are not changed during the implementation either.

Based on the results organizations should support those workers whose work processes are not changed, but also, offering training to those whose work processes are changed seems to be a good way to make the employees feel more supported.

In three sites the reported level of received training seemed to be low. Only on one site 4% of the participants reported to have declined from the offered training. It seems that based on results, if employees are offered training, they most likely do not decline from it. In almost all sites, except among the global employees and site 5, over half of those who did not receive training still had their work processes changed. On site 3, 6 and 7 all of those who did not receive training still had their work processes changed.

In two sites the percentage of those who felt the training was sufficient was over 70%. Those who received training were more likely to feel that the training was sufficient than those who did not receive training. This would suggest that there is a relation between receiving training and the feeling that the training is sufficient. In couple of sites there were participants who felt the training was sufficient even if they answered that they did not receive any training. There did not seem to be a difference in the

feeling of sufficiency among those who received the training depending on if their work processes were also modified or not. Based on the results the sufficiency of the training also seemed to be affected by the feeling of having time to participate in the training.

Among those who felt that their supervisor took the trainings into account when scheduling their work it was most likely to also feel that their supervisor supported them enough during the project. Among those who felt the trainings were not taken into account the feeling of being supported was more divided. Based on the results taking the trainings into account when scheduling work and making enough time for the trainings seem to effect positively on the feeling of being supported.

The survey results suggest that offering training has an effect on the feeling of system fit if work processes are changed. Also, when work processes are changed, offering training seems to have an effect on feeling of being supported. When employees have enough time to participate in the training they are more likely to also feel supported and that the training is sufficient.

The group of the participants who felt the project was overall successful was the largest in all of the sites. There seemed to be a relation between positive expectations before the project and the feeling of a positive outcome in the end. Based on the results having no expectations or negative expectations did not seem to have a clear relation to the feeling of success after the project. Based on the results it would be efficient for the organizations to enhance the positive atmosphere considering the upcoming project to support the employees to have positive expectations.

The survey findings were not in conflict with prior research. Some of the findings of this study did not come up in the prior research used for this study. Based on the results of this study offering training seems when work processes are changed and ensuring that employees feel they have enough time to participate in trainings seem to have an effect on feeling of being supported. The feeling of having enough time and ability to participate in trainings also seems to affect the feeling of training sufficiency.

7. Discussion and implications

This study produced the artifact, the model, and a survey to understand the situation in multinational companies considering users' perspective of ERP implementations. Researchers have developed different models to explain technology acceptance and usage, such as the ones discussed in this study. The model developed in this study adds its own input from the point of view of ERP implementations. The survey gives valuable information from the users themselves, and the feelings and viewpoints of end users concerning ERP implementations have also been researched before (Nah et al., 2004).

The created artifact, the model, helps to understand which factors affect users' acceptance and technology usage in ERP implementation setting. The model has been refined from the prior research, and it unites the UTAUT, which already unified the essential elements of eight different models which explain technology acceptance and usage, with more recent research about the subject. The proposed model has five core constructs; Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions and Attitude which affect to the Symbolic Adoption. Three moderating factors affect to the mentioned constructs; Gender Roles, Age and Experience.

The factors Performance Expectancy, Effort Expectancy and Social Influence were kept as in the original UTAUT-model by Venkatesh et al. (2003). The factor Facilitating Conditions was modified according to the model by Keong et al. (2012). In their model training, communication and shared belief were used to measure the factor Facilitating Conditions. In the study by Dwivedi et al. (2019) a relation between Facilitating Conditions and Behavioral Intention was found.

The factor Attitude was left out from the original UTAUT-model, but in the Meta-UTAUT by Dwivedi et al. (2019), it was included. The decision to include the factor in the model was based on previous literature they reviewed. Also the study by Alshare et al. (2019) included the factor in their model, and it was argued that based on the literature end-user's attitude towards the system is a critical factor. There was also support for including the factor Attitude to the model in other literature (Nah et al., 2004; Abdinnour-Helm et al., 2003; Ghobakhloo et al., 2012). The results of this study suggest including the factor Attitude in the model of user's acceptance and technology usage in organization's ERP implementation.

The moderating factors were taken from the original UTAUT model by Venkatesh et al. (2003). In this model the moderating factor Gender was re-defined as Gender Roles to have a more clear definition for it. It was already highlighted in the study by Venkatesh et al. (2003) that the moderating factor "Gender" meant gender roles, and not biological gender. The moderating factors Age and Experience were kept as they were in the original UTAUT by Venkatesh et al. (2003). In the study by Abdinnour-Helm et al. (2003) Experience was found to affect the factor Attitude. The moderating factor Voluntariness was removed from the moderating factors, as suggested by Keong et al. (2012). In ERP implementation projects the system usage is mandatory, which means that the moderating factor Voluntariness is not needed. In the proposed model the constructs Behavioral Intention and Use Behavior were united as Symbolic Adoption.

This was due to the non-shared meaning of the constructs Behavioral Intention throughout the research (Nah et al., 2004).

In the proposed model the constructs Behavioral Intention and Behavior were united as one construct, "Symbolic Adoption". Nah et al. (2004) suggested that the term Symbolic Adoption is a better concept to be used in settings where the use is mandatory. The construct Behavioral Intention seems not to be shared throughout the research field, and there are contradictory results if different factors affect the Behavioral Intention in mandatory settings. This seems to be because of the non-shared definition of the concept itself (Nah et al., 2004).

The model created in this study answers to the research question of this study, "Which constructs affect user's technology adoption in ERP implementations?". The proposed model was reviewed and evaluated by the ERP-implementation project management and project group, and the comments given supported the model. The model was also evaluated based on the survey, and the survey results support including the "Attitude" factor to the model.

The model was evaluated with the ERP-implementation project team of the company, which included twenty employees from different parts of the organization; global project manager, local project leaders and the project leaders of the different areas, such as finance or manufacturing. The model was presented and explained to the team. In the discussion most of the opinions were focused on concrete action points which could be done to affect the constructs. The comments were listed, and all of them could clearly be traced to the constructs of the model. Based on the discussion the model is comprehensive and covers the different areas of ERP implementation.

The artifact has already been used in action as a tool for discussion in the company the artifact was evaluated in. The artifact gives a better view of technology acceptance and use in ERP environment than the original UTAUT by Venkatesh et al. (2003), since it focuses more in the mandatory use environment of ERP implementations. The artifact also refines some of the concepts of UTAUT to be clearer, such as Gender Roles and Symbolic Adoption.

This study also produced an empirical research in the form of a survey conducted in a multinational company. The company had previously implemented an ERP system, and the survey was conducted to understand users' point of view considering the ERP implementation. The survey produced both qualitative and quantitative data.

The questions were divided in four different categories; communication, process changes, trainings and support. The participants were also asked about their overall feeling of the ERP implementation project, their opinions of what would have helped the project, additional comments and also their wishes for the next ERP implementation, which was already in sight at the time of the survey.

The results of the survey suggest that the relation between positive expectations about the upcoming implementation and the positive feeling of outcome exists. This survey result supports including the factor Attitude in the artifact created in this study, the proposed model. Attitude has been recognized to affect in technology acceptance and usage in the original TRA, TPB and TAM (Davis et al., 1989; Ajzen, 1991; Davis, 1986;).

According to the result offering training seems to have an effect on the feeling of system fit. In almost all of the sites those who received training were also more likely to feel that the system fits their work processes, especially when those work processes are changed. Based on the results employees are not likely to decline from training if it is offered, and only 0,84% of the participants reported to have declined from the training if it was offered. According to the survey, all the employees who would need the training do not receive it in ERP implementation context. In some sites all of those who did not receive training still had their work processes changed. The importance of training is well-recognized in the studies of the field (Keong et al., 2012; Sumner, 1999). According to the results of this study, trainings should be aimed at least to those whose work processes are modified.

An important notion considering the survey was that in none of the sites all employees felt that they understood why the changes to the work processes were made, and in two sites the percentage was under 60%. Communicating effectively the scope and objectives of the project and the changes it will bring has been listed as a success factor in ERP implementations (Sumner, 1999).

Some of the findings did not come up in the source material used for this study; the results suggest that when work processes are changed, offering training seems to have an effect on feeling of being supported, and that when employees have enough time to participate in the training they are more likely to also feel supported and that the training is sufficient. Also both the fact if training is received and the feeling of having enough time to participate in the training seem to affect the feeling of training being sufficient.

The proposed model was analyzed in the light of the survey conducted, and the survey supports including the factor Attitude to the model. The survey results suggested that employees who have positive expectations about the upcoming ERP implementation project are more likely to have a positive feeling of the successfulness of the project after the implementation. The results also implicated that offering training has an effect to the feeling of system fit, and offering training also affected to the feeling of being supported when work processes are changed. According to the results, ensuring that employees have enough time to participate in the trainings makes them feel more supported and enhance the feeling of training sufficiency. This would suggest that Facilitating Conditions –factor also has a relation to Effort Expectancy –factor.

Both the model and the survey results give valuable insight to both researchers of the field and to the companies which are implementing ERP systems. Based on the survey results suggestions were made to the company's ERP implementation project group, considering the upcoming implementation project of the company. The suggestions were made to each site based on their own employees' answers, and they were presented to each site's project team. The global results were also presented to all of the sites. The results have therefore already been in use.

8. Conclusion

This thesis had two products; the artifact in the form of the proposed model was created to answer the research question “Which constructs affect user’s technology adoption in ERP implementations?”, and the survey which was conducted in a multinational company which had implemented an ERP system. The model was evaluated and discussed in a meeting with the ERP implementation project team of the company, and in the light of the survey. The survey results were presented to the project teams of each site and based on them suggestions were made both globally and for each site individually considering the new upcoming ERP implementation.

For the limitations of this study, in the survey some of the sites had years in between of the implementation and the survey. Some participants did not remember how they felt before or during the actual implementation. The feeling they have now might also alter the memory of what they felt before. Also the actions during the implementation project on different sites differed, and the differences in actions have not been taken into account in this study. It also needs to be noted that every user has their own definition of a “successful” ERP-system implementation, and the feeling of successfulness is subjective. In the literature review, a limitation of non-shared definitions of constructs must be noted. As said in Moore & Benbasat (1991), the research of IT adoption is based on constructs, and without shared definitions of the constructs, topics and concepts, it is difficult to have a cumulative research tradition.

For future research, the model presented in this study should be tested more to get more support for it. The survey gave valuable data which could be analyzed more, especially by analyzing the results of the sites and comparing the different actions the different sites took. The model could also be improved with concrete action points for the organizations which are implementing an ERP system. This study mostly focused on the literature aspect, and evaluated the model a discussion with professionals and a survey. The model was supposed to be evaluated in action in a new upcoming ERP implementation project, but this was postponed due to Covid-19.

9. References

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Appendix A. The survey questions

1. In which site do you work?

2. In which department do you work?

3. Were you working in *the company name* during the implementation of IFS 7.5 to your site?

4. Did you understand why IFS 7.5 was implemented on your site?

5. Describe in your own words, why the implementation of IFS 7.5 was done.

6. Did you have positive or negative expectations about the upcoming IFS 7.5 implementation before the implementation took place?

7. Describe your expectations about IFS 7.5 implementation before it took place

8. Did you understand why processes in your factory were changed the way they were changed during the implementation of IFS 7.5?

9. Describe why the changes in the processes were made on your site. Was there something that was unclear to you about the changes and the new processes?

10. Do you feel that IFS 7.5 fits to your work processes?

11. Were your work processes modified during the implementation?

12. How did you feel about the process changes?

13. Did your supervisor and management support you enough when the processes were changed?

14. Did you get training for the new processes?

15. What kind of training did you get before, during and after the implementation of IFS 7.5?

16. Was the training sufficient?

17. What more would you have wished from the training?

18. Did you have enough time to participate in the training?

19. Were the trainings taken into account when scheduling your work by your supervisor?

20. Do you think implementing IFS 7.5 helped in our goal to satisfy customers?

21. Do you think the management supported the project enough (enough time, training, other resources)?

22. In which ways the management did, or did not support enough the implementation project, in your opinion?

23. Do you think the implementation project was taken into account when scheduling your work?

24. Do you feel that your own site had enough attention in the project?

25. Did you get enough support from your supervisor during the implementation?

26. What is your overall feeling about the implementation of IFS 7.5 system?

27. Do you think the implementation project was successful or not?

28. What things would have helped you in your work during implementation?

29. What things would have helped the implementation project in your opinion?

30. Do you have any additional comments about IFS 7.5 implementation?

31. What do you wish that was taken more into account when upgrading to IFS 10?